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EMBIA

Contributions to the Biosystematics of the Insect Order Embiidina

Part 5
A Review of the Family Anisembiidae With Descriptions of New Taxa

By
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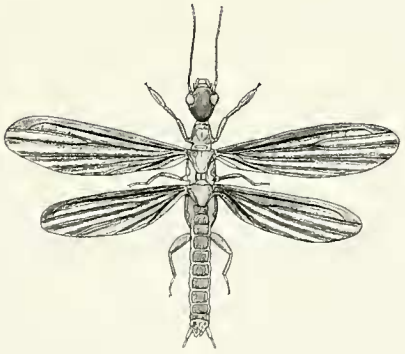

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Part 5

A Review of the Family Anisembiidae With Descriptions of New Taxa

Abstract

All named species of the exclusively New World family Anisembiidae are treated. Included are one hundred nine species (sixty-seven new) assigned to nine subfamilies (seven new), four tribes (three new), and twenty-four genera (fifteen new). Because of the urgency of important, future studies in other sections of the order Embiidina, I am not describing many, relatively uninteresting anisembiids, especially South American species of the large genus *Chelicerca* Ross. For the user's convenience, species of *Chelicerca* are treated regionally: North American, Mesoamerican and South American. Fortunately these faunas are quite distinct.

Introduction

Almost all reported species were collected and cultured by me except for those secured by my former field assistant, David Cavagnaro. Primary types of most previously-named species were also studied. All figures and photographs, except those of Dominican Amber fossils, were made by me. In some cases, previously-published figures are included. The drawings, not equal in scale, usually omit setae even though these may prove to be useful characters in future studies — particularly in distinguishing closely related species. The drawings were produced over a period of years. I now use pencil-shading to indicate degrees of sclerotization. Membranous, intersclerotal areas are stippled. Whenever possible, color descriptions are based on live or freshly-killed specimens. For clarity and preservation, studied specimens are KOH-cleared and mounted in Canada Balsam on microscope slides (coverslip supported to avoid crushing).

Holotypes were selected from the largest series and paratypes have almost the same reference value inasmuch as almost always they are from the holotype's culture. Parallotypes (although not a recognized term) are adult females from the type's culture.

Non-topotypic males aren't designated paratypes; instead, they are treated as "other specimens examined." Whenever possible, paratypes are deposited in appropriate institutions, as designated below.

Institutional symbols: AMNH – American Museum of Natural History, New York; BMNH – British Museum, Natural History, London; CAS – California Academy of Sciences, San Francisco; IHNB – Instituto de Historia Natural, Bogota, Colombia; INBIO – Instituto Nacional de Biodiversidad, Costa Rica; IFML – Instituto Miguel Lillo, Tucumán, Argentina; MIZA – Museo de Zoologia Agricola, Maracay, Venezuela; MUSM – Museo de Historia Natural, Lima, Peru; MNRJ – Museo Nacional Rio de Janeiro, Brazil; MZUSP – Museu de Zoologia da Universidade de São Paulo, Brazil; UNAM – Instituto Biologia, UNAM, Mexico, DF; NMQ – Museo de Ciencias Naturales, Quito, Ecuador; PUCE – Pontificia Universidad Catolica del Ecuador, Quito; USNM – United States National Museum, Washington.

Explanation of terminalia and wing symbols: 9 = ninth abdominal tergite; 10 L = left hemitergite of abdominal somite 10, 10 LP = its process; 10 R = right hemitergite of 10, 10 RP = its process; MS = medial sclerite of somite 10; MF = medial flap, (a portion of which may include process of 10 R); EP = epiproct (somite 11); H = hypandrium (ninth sternite), HP = its process; GO = gonapophysis; LPPT and RPPT = left and right paraprocts; LC_1, LC_2 = segments of left cercus. Wing veins: C = costa; RBS = radial blood sinus (RA); RP = posterior radius; MA and MP = branches of media; CU = cubitus.

CHECKLIST OF THE FAMILY ANISEMBIIDAE

Subfamily Anisembiinae Ross
- Tribe Stenembiini, new
  - Genus *Stenembia* Ross
    - *symmetrica* (Ross), Colombia
    - *perenensis* Ross, Peru
    - *exigua* Ross, Amazon Basin
  - Genus *Ectyphocerca*, new
    - *aureata* n. sp., Peru
  - Genus *Mesembia* Ross
    - *hospes* (Myers), Cuba
    - *pico* n. sp., Cuba
    - *venosa* (Banks), Cuba
  - Genus *Phallosembia*, new
    - *andina* n. sp., Ecuador
  - Genus *Isosembia* Ross, new
    - *aequalis* (Ross), SE Brazil
- Tribe Saussurembini, new
  - Genus *Saussurembia* Davis
    - *davisi* Ross, Costa Rica
    - *albicauda* Ross,Panama
- Tribe Anisembiini, new
  - Genus *Anisembia* Krauss
    - *texana* (Melander), Texas, NE Mexico
  - Genus *Glyphembia*, new
    - *chamulae* (Ross), Mexico: Chiapas
    - *juarenzis* (Mariño and Márques), Mexico: Puebla
    - *taepae* n. sp., Mexico: Chiapas
    - *amberica* n. sp., Dominicam amber
    - *catemacoa* (Ross), Mexico: Vera Cruz
    - *guatemalae* n. sp., Guatemala
    - *haitiana* (Ross), Haiti
    - *dominicana* n. sp., Dominican Republic
    - *vetehae* (Szumik), Dominican amber
  - Genus *Bulbocerca* Ross
    - *sini* (Chamberlin), Mexico: Baja California, Sonora
    - *nigra* n. sp., Mexico: Baja California
    - *fulva* Ross, Mexico: Baja California
    - *minuta* n. sp., Mexico: Baja California
- Tribe Exochosembini, new
  - Genus *Exochosembia*, new
    - *cavagnaroi* n. sp., Guatemala
    - *unicolor* n. sp., Honduras
  - Genus *Pogonembia*, new
    - *motaguae*, n. sp., Guatemala
    - *neovenosa* (Mariño), Mexico: Puebla
- Tribe Poinarembiini, new
  - Genus *Poinarembia*, new
    - *rota* n. sp., Dominican Amber

Subfamily Scolembiinae, new
- Genus *Scolembia*, new
  - *celata* n. sp., Bolivia: Yungas
  - *penai* n. sp., Bolivia: Yungas

Subfamily Aporembiinae, new
- Genus *Aporembia*, new
  - *sturmi* n. sp., Colombia

Subfamily Chorisembiinae, new
- Genus *Chorisembia*, new
  - *howdeni* n. sp., Trinidad

Subfamily Platyembiinae, new
- Genus *Platyembia*, new
  - *tessellata* n. sp., Western Amazonia

Subfamily Cryptembiinae, new
- Genus *Cryptembia*, new
  - *amazonica* n. sp., NE Brazil
  - *paraensis* n. sp., NE Brazil
  - *manaurara* n. sp., Central Amazonia
  - *caprilesi* n. sp., S Venezuela
  - *multicolor* n. sp., Peru
  - *macoae* n. sp., S Colombia
  - *rondonia* n. sp., Brazil: Rondônia
  - *fusca* n. sp., Peru
  - *anandra* n. sp., (Insertae Sedis), Colombia

Subfamily Chelicercinae Ross
- Genus *Brasilembia*, new
  - *beckeri*, n. sp., SE Brazil
- Genus *Schizembia* Ross
  - *grandis* Ross, Venezuela
  - *bryophila*, n. sp., Venezuela
  - *callani* Ross, Trinidad
  - *guanare*, n. sp., Venezuela
  - *colombiana*, n. sp., Colombia
  - *hirsuta*, n. sp., Trinidad
- Chelicercinae of Mexico
- Genus *Chelicerca* Ross
- *Dampfi* Group
  - *dampfi* Ross, Mexico: Chiapas
- *Wheeleri* Group
  - *wheeleri* (Melander), Mexico: Guerrero
  - *guerreroa* n. sp., Mexico: Guerrero
  - *albitarsa* n. sp., Mexico: Oaxaca
  - *amatitlana* n. sp., Mexico: Puebla
  - *tantilla* n. sp., Mexico: Puebla-Oaxaca

Family Anisembiidae Davis

Anisembiidae Davis, 1940c:535; 1940d:681.—Ross, 1940b:642; 1944:434.—Dennis, 1949:742.—Kaltenbach, 1968:4.—Ross, 1970:169; 1984b:19. —Szumik, 1996:51 (cladogram).

Mesembiinae Ross, 1940b:643 (Type genus: *Mesembia* Ross); 1944:435 (as an invalid category).

Anisembiinae Ross, 1940b:649 (Type genus: *Anisembia* Krauss); 1944:435 (as an invalid concept); 1984b:19 (reinstated).

Type genus.—*Anisembia* Krauss, 1911, by original designation.

Distribution.—Confined to Neotropical region except for limited extension into south-central and southwestern United States. Occurs in a wide range of environments from rain forest to desert, sea level to high altitude.

Description.—Males: Highly diversified, apterous or alate; moderately large to very small (body length 6–20 mm); having the following characters in common: mandibular apices simple, acute, i.e., lacking multiple apical dentation; however, some species have mandibles with great molar development and subapical projections, e.g., a medial flange on the left mandible which isn't homologous to apical dentation. Submentum, with one exception, always weakly sclerotized with margins not inflexed, (submentum sclerotic, shield-like, only in *Chorisembia* n. gen., of Trinidad). Wings, when present, with MA always unforked; venation simple with few, if any, cross-veins. Hind basitarsus always lacking a medial (second) papilla. Abdominal terminalia varying from near-symmetry (with left cercus identical to the right), to great complexity in all structures, including "absorption" of the distal segment of the left cercus into the basal segment. Tenth tergite partially to completely cleft; right hemitergite (10 R) without a definite flap (MF), however, MF may be associated with the epiproct (EP) which often is a narrow sclerite closely appressed, or fused, to inner side of the right hemitergite; hypandrium process (HP) varying from near obsolescence to great size and complexity with secondary, often echinulate, lobes. Ejaculatory duct often with elongate, gonapophyses (GO) on each side. Paraprocts (LPPT, RPPT) at times large, symmetrical, but usually with reduced sclerites never bearing processes or lobes. Left cercus varying from two-segmented, without lobes or echinulation, through a two-segmented condition with lobes and echinulations, thence, to a long, arcuate, single segment almost without trace of fusion (or "absorption") of the apical segment. Females and nymphs not having special family characters except in the consistency of the single papilla on the basitarsus.

Discussion.—Considering the great diversity of terminalia structure in this family, the consistency of unifying characters (the apically non-dentate mandibles, the unbranched MA vein, and the lack of a second basitarsal papilla) is surprising. Except possibly for the genus *Chorisembia*, I am satisfied that the family is a natural group and that its characters haven't resulted from convergence. The number and diversity of genera indicate great antiquity for the family and, therefore, it is remarkable that it apparently doesn't occur in the Old World.

The non-dentate mandibles of adult males, although seemingly a superficial feature, is one of the best characters for recognizing the family. The only non-anisembiid males of the order with similar mandibles belong to a few genera of West African Scelembiinae (family Embiidae) and to some undescribed American species of Teratembiidae. Such similarity is due to convergence, not relationship.

As a result of extensive fieldwork throughout the range of Anisembiidae, I have amassed a very large collection representing many species, old and new. Some can be assigned to clearly defined genera but many form "peaks and valleys" of relationship which, of course, makes classification difficult — especially if cladistic analysis is attempted. The same problem exists in the definition of supergeneric categories, such as tribes and subfamilies. Paradoxically, the richer the collection, the more difficult the task of classification.

Based on an empirical (= experiential) approach, not cladistics, I have developed a serviceable classification which, of course, is far from satisfactory, and, subject to modification based on yet-to-be-discovered species. Because of shortness of time, and, in consideration of more significant investigations I face with other sections of the order, I am not, at this time describing all closely related species, such as those in my genera *Glyphembia* and *Chelicerca* (of which I have seventy-five species).

KEY TO SUBFAMILIES OF ANISEMBIIDAE
(Adult males)

1. Submentum sclerotic, shield-like; all of its margins, including the anterior, are inflexed (as in *Oligotoma*); anterior angles produced. Known only from Trinidad ..... Chorisembiinae
— Submentum weakly sclerotized, quadrate; all margins, especially the anterior, weak, not inflexed; anterior angles not produced 2
2. Inner side of right hemitergite (10 R) bearing two large, sclerotic, caudally-arcuated "claws" (MF?). Cercus segments slender, elongate; lobe of basal segment of left cercus medial. Known only from upper Amazon Basin .... Platyembiinae
— Inner side of 10 R without "claws." Cercus segments of normal shape and length; lobe of basal segment, if present, terminal or subterminal. Extensive distribution 3
3. Epiproct sclerite (EP) attached to 10 R near inner apex of process 10 RP; its anterior extremity usually bearing an upturned, narrow, sclerotic projection. Adjacent surface of 10 R usually with a sclerotic, often nodulose area. Amazon Basin and N South America .... Cryptembiinae
— Epiproct sclerite, if developed, otherwise attached or fused to 10 R; its anterior extremity without an upturned projection. Adjacent surface of 10 R without a sclerotic, nodulose area. 4
4. Basal segment of right cercus with basal rim sclerotized, usually asymmetrically flared. Hypandrium lobe (HP) broad, apex sclerotized, usually bearing a sclerotic point or hook. Right tergal apex (10 RP), or curvature, bearing one or more hooks or "talons" .... Chelicercinae
— Basal rim of right cercus weakly, if at all sclerotized; never flared. Hypandrium lobe simple, unarmed, weakly sclerotized. Right tergal apex unarmed; or, usually truncate, blunt or tapered to a sharp point 5
5. Medial cleft of tenth abdominal tergite very broad. Epiproct sclerite (EP) large, linked to inner side of 10 R at base; bearing a microspiculate, translucent elevation across its base. Small species (body length about 5 mm) known only from Rio Magdalena Valley of Colombia. ..... Aporembiinae
— Medial cleft narrow, often basally closed. Epiproct sclerite (EP), if broad, it is broadly attached to 10 R but usually it is slender and entirely fused to inner side of 10 R; never with a microspiculate elevation across its base. Body usually longer than 5 mm. Widespread in Neotropical region and south-central USA 6
6. Large, body length at least 12 mm. Epiproct sclerite (EP) large, broad, entirely fused to 10 R on its right side. Right process (10 RP) acutely tapered to a fine point (as in *Oligotoma*). Known only from Yungas zone of eastern Boliva ..... Scolembiinae
— Size small to moderate, body length usually less than 10 mm. Epiproct sclerite (EP) usually small or obsolete but, if large, it is fused to 10 R only at its base. Right process (10 RP) usually apically spatulate or truncate. Widespread in Neotropics. ..... Anisembiinae

Subfamily Anisembiinae Ross

Anisembiinae Ross, 1940b:649; Ross, 1944:434 (as an invalid concept); 1984b:19 (redefined and reinstated).

Mesembiinae Ross, 1940b:643 (type genus *Mesembia* Ross, 1940a); 1944:434 (as an invalid concept).

Type genus.—*Anisembia* Krauss, by original designation.

Distribution.—New World: South-central U.S.A., southward throughout Neotropical region.

Description.—Males usually small (body length averaging less than 10 mm); alate or apterous, vestiture of normal length. Mandibles highly variable, from short and simple to great elongation and enlargement of molar (basal) portion. Submentum never heavily sclerotized, margins never inflexed. Tenth abdominal tergite rarely cleft to base. Left tergal process (10 LP) always simple, apex at times weakly sclerotized. Right tergal process (10 RP) usually abruptly narrowed; apex broad, blunt, often truncate. Epiproct sclerite (EP) usually narrow and completely fused to inner side of right hemitergite but at times broad; never with "talons" or spiculation at base (such complexities are perhaps always homologs of the medial flap). Hypandrium lobe (HP) weakly developed, broad caudally, without sclerotic rim, spiculations, lobes or other peculiarities. Paraprocts (LPPT and RPPT) at times subequal but in many species the right is obsolete. Basal segment of left cercus with or without an inner, echinulate

lobe; distal segment often fused to the basal. Basal segment of right cercus with base circular, usually weakly sclerotized. Females without apparent subfamilial characters.

Discussion.—This subfamily was first proposed over sixty years ago when very few species of Anisembiidae were known. Its definition was based on the absence of articulation between the two left cercus segments. Now, with an abundance of new taxa, it is realized that there are many degrees of articulation reduction of the distal segment during its "absorption" within the basal segment. This is often referred to as "fusion." Because a "one segmented" cercus is a more effective clasper during copulation, it shouldn't be surprising that the adaptation appears independently, through convergence, on many unrelated evolutionary lines. Therefore, it should be used with great caution in cladistic analysis. It can even appear intragenerically, or intraspecifically. However, at times it can be a consistent, valid character, e.g., in the family Australembiidae.

It should be noted that a one-segmented left cercus never occurs in families, such as Teratembiidae and Oligotomidae, which apparently never use the entire left cercus as a copulatory clasper. Instead, in such families, inner processes and lobes on the left cercus basipodite assist clasping, therefore the left cercus is always two-segmented.

As here defined, the subfamily may prove to be a "catch-all" for many unrelated genera varying from nearly complete terminalia symmetry to complex asymmetry. Plesiomorphic characters include: symmetry of the cerci; near symmetry and simplicity of tergal processes and paraprocts; a broad, semi-detached epiproct sclerite; and stronger wing veins with more cross-veins. Apomorphic characters include: basal segment of left cercus lobed and echinulated and fused; complex left tergal process (10 LP); right paraproct (RPPT) obsolete, or its fragment fused to hypandrium (H); epiproct (EP) very slender, fused to, or tightly-appressed to, inner margin of right hemitergite (10 R). Wings more slender with great reduction of vein-strength and fewer cross-veins; a tendency for the radial blood sinus (RBS) to slant into costal margin before wing apex. Unfortunately for a cladistic analysis, the above characters often intermix within a genus, or a tribe.

Tentatively, the subfamily's genera are grouped in seven tribes identified by means of the following key.

KEY TO TRIBES AND GENERA OF ANISEMBIINAE

(Adult males)

1. Basal segment of left cercus unlobed, form similar to that of right cercus; distal segment never fused to the basal 11
— Basal segment of left cercus lobed, the lobe usually echinulate; distal segment occasionally fused to the basal 2
2. Lobe of left cercus large, hemispherical, flattened; echinulations large, on a single plane, like cogs of a cogwheel. Dominican Amber fossil. (Poinarembiini) ..... *Poinarembia*
— Lobe of left cercus moderate sized, merely a swelling, or a globular projection. When echinulate, the echinulations are small, randomly scattered. Widespread American genera, including two amber fossil species 3
3. Both paraprocts well defined, large, elongate, almost equal in size. SE Brazil. (Isosembiini) ..... *Isosembia*
— Right paraproct usually poorly defined; at times obsolete, or represented only by fragmentary sclerites. Widespread in Neotropical region . 4
4. Clypeal margin heavily sclerotized, projected forward, especially on outer angles. Guatemala, Honduras. (Exochembiini) ..... *Exochembia*
— Clypeal margin not sclerotic or projected 5
5. Left tergal process (10 LP) very broad, diagonally striate, bearing a tuft of prominent wavy setae on inner caudal margin, which arise from tightly clumped setal sockets. Mexico, Guatemala. (Exochembiini) ..... *Pogonembia*
— Left tergal process (10 LP) narrow, without a tuft of setae on inner-apical margin 6
6. Epiproct sclerite (EP) broad, at times diagonally transverse; usually separated from inner margin of right hemitergite (10 R) by a small, membranous interval 7
— Epiproct sclerite very slender, usually sclerotic; closely aligned or fused to inner side of 10 R 9
7. Left mandible with a conspicuous, obtuse, angular flange on incurvature basad of apical point. S central USA and NE Mexico. (Anisembiini) ..... *Anisembia*
— Left mandible evenly incurved, without a flange 8

8. Tenth tergite completely cleft to basal margin, base of cleft with an enlarged membranous area at inner-basal corner of left hemitergite. Eastern Mexico, Belize, Hispaniola. (Anisembiini) ..... *Glyphembia*

— Tenth tergite not cleft to basal margin. Mexico, Baja California and coastal Sonora. (Anisembiini) ..... *Bulbocerca*

9. Basal segment of left cercus thick; inner lobe medial, evenly rounded, without echinulations. Peru: upper Río Marañón (W Amazon Basin). (Stenembiini) ..... *Ectyphocerca*

— Basal segment slender, cylindrical; lobe usually apical and echinulate 10

10. Left mandible with a very large, acute angular flange basad of apical point. Sclerite of left paraproct large but slender; apex, curving dorsad between inner base of left cercus and left tergal process, bears a rounded spiculate nodule. Margins of ejaculatory duct darkly sclerotized. Ecuador and Peru. (Stenembiini) ..... *Phallosembia*

— Left mandible without a subapical flange. Left paraproct broad, not extended dorsad. Margins of ejaculatory duct (GO) not sclerotized. Cuba. (Anisembiini) ..... *Mesembia*

11. Tergal processes closely aligned. Tergal cleft very short, its margins unsclerotized. Widespread in South America. (Stenembiini) ..... *Stenembia*

— Tergal processes well separated. Cleft extended forward into basal third of tergite where, after closing, extends to the tergite's base as a sclerotic line. Costa Rica, Panama (Saussurembiini) ..... *Saussurembia*

TRIBE STENEMBIINI
Genus *Stenembia* Ross

Stenembia Ross, 1972:139.

Type species.—*Stenembia perenensis* Ross, by original designation.

Name basis.—Greek *stenos* = narrow, in reference to slender body form.

Distribution.—South America: Tropical forest habitats.

Description.—Males small, slender, body length averaging 7 mm, always alate; usually unicolorous tan to black. Head elongate oval to circular; eyes small to large, facet interstices usually unpigmented; mandibles small, very narrowly tapered and pointed distad, outer basal angles often acute, inner-apical arc of left mandible without an acute medial flange; submentum weak, quadrate. Wings with RBS often merging with C well before apex of wing; RP + MA and RP sclerotized, all other veins represented only by rows of setae; all cross-veins absent except for one or two between RBS and RP; hyaline stripes narrow, sharply defined. Hind basitarsus elongate, without a medial papilla; plantar setae variable in length, often very long. Tenth abdominal tergite not cleft to base and without a sclerotic line continuing to base from inner margin of left process. Left process (10 LP) narrowly tapered and slender, apex often unsclerotized and scarcely visible. Right process (10 RP) broadly-produced, obliquely-truncate at apex; inner side closely aligned with that of 10 LP. Epiproct sclerite (EP) very narrow, elongate, dark, closely aligned with, and overlapped by, inner side of right hemitergite. Hypandrium (H) irregularly sclerotized, left half largely membranous; its process (HP) elongate, directed leftward, partially membranous. Gonapophysis rods (GO) inconspicuous, not sclerotized. Paraprocts well sclerotized; the left (LPPT) fused to side of HP and curved dorsad near inner-base of left cercus, its dorsal apex not microspiculate. Cerci perfectly symmetrical; in some species they are white, in others they are well pigmented. Females without significant generic characters.

Discussion.—As originally proposed, *Stenembia* included a group of species with a lobed, echinulate left cercus, as well as other distinctions. Such species are now assigned to the distinct new genus, *Phallosembia*. *Stenembia* appears to be restricted to wet, tropical forest habitats where the various species establish colonies on and in bark of trees, logs, among epiphytes, on fence posts and road banks. In contrast, species of *Phallosembia* apparently are usually limited to coastal and mountainous, semiarid localities of western South America.

Component species.—1. *Stenembia symmetrica* (Ross), 1944:436. Holotype, male, USNM, Colombia: Río Frío (Originally assigned to *Saussurembia* Davis. Transferred to *Stenembia* Ross by Ross, 1972:140). Males collected near Rancho Grande, Venezuela appear to be this species.

2. *Stenembia perenensis* Ross, 1972:140. Holotype, male, CAS. Peru: Colonia Perené, near La Merced, Junín. (Fig. 1).

3. *Stenembia exigua* Ross, 1972:142. Holotype, male, CAS. Brazil: Belém. (Fig. 2).

In addition, there are several new species in my collection from Venezuela, Colombia, and Peru.

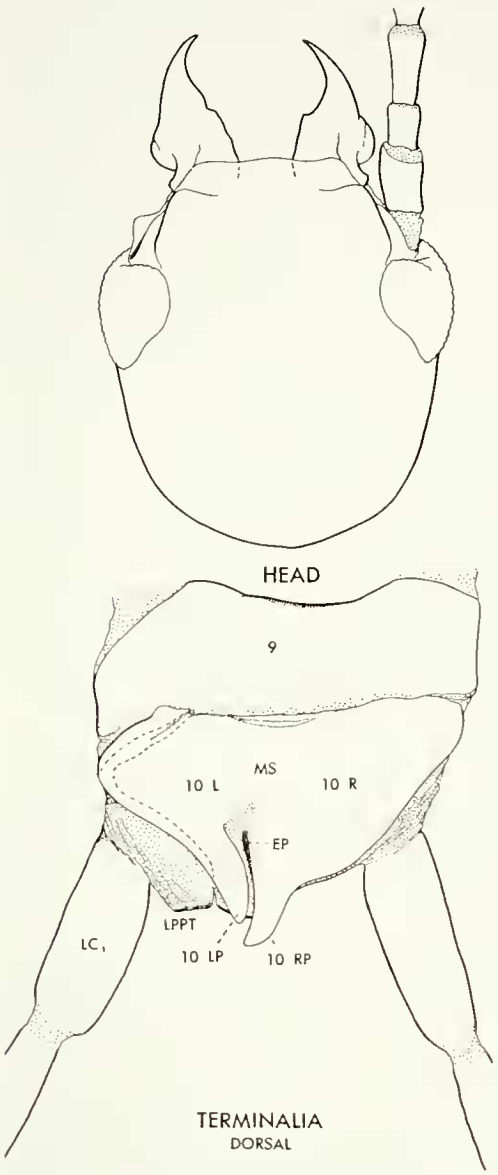

FIGURE 1. *Stenembia perenensis* Ross, holotype. Type locality: Peru: Colonia Perené, Rio Perené, near La Merced, Junin.

Genus *Ectyphocerca* Ross
new genus

Type species.—*Ectyphocerca aureata* Ross, new species, by present designation.

Name basis.—Greek *ektyphos* = puffed up + *cerca*, in reference to the swollen left cercus.

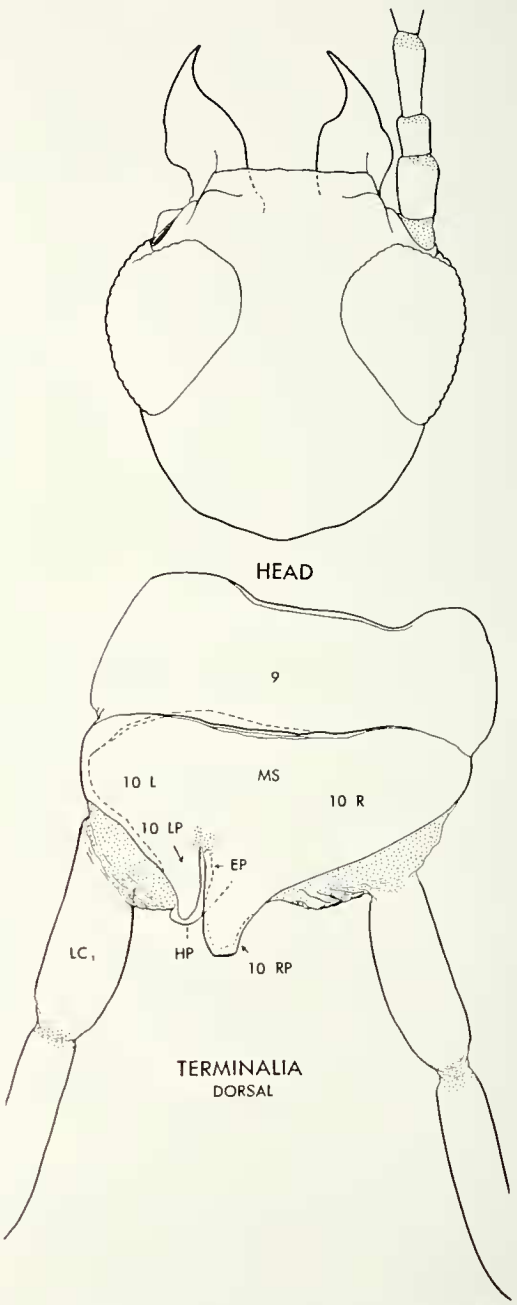

FIGURE 2. *Stenembia exigua* Ross, holotype. Type locality: Brazil: Belém.

Distribution.—Peru: Headwaters of Rio Marañon.

Description.—Males: Small, alate, pale tan with golden head. Cranium elongate oval with rather large, coarsely faceted, black eyes. Mandibles very acutely pointed; outer bases with pronounced, acute angles which are less sclerotized than other portions of the mandibles; left mandible with a strong medial flange. Tenth tergite not cleft to base, its processes as in *Stenembia*; left process (10 LP) narrow, closely aligned with right process (10 RP) and almost equal length, weakly sclerotized and almost transparent. Left and right paraprocts entirely membranous without sclerites—only a few setae. Hypandrium lobe centered; broad, rounded, ejaculatory duct with a pair of long rod-like gonapophyses (GO). Basal segment of left cercus stout, almost as broad as long, basal rim and inner-base sclerotic; lobe narrowly rounded, its caudal margin extending almost straight back, thus causing distal two-thirds of segment to be exceptionally broad; surface of lobe smooth, lacking echinulations. Base of right cercus circular, not sclerotic; basal segment cylindrical, evenly sclerotized. Distal segments normal, apices pale. Females: Without noteworthy generic characters, coloration similar to males.

Discussion.—The tenth tergal structures indicate a close relationship with *Stenembia* and *Phallosembia*. The peculiar mandibles and the stout left cercus with a thick, non-echinulate lobe justifies a separate generic status. Probably a number of related species await discovery in the arid zones of the upper Rio Marañon.

Ectyphocerca aureata Ross

new species

(FIGURE 3)

Holotype.—Male, on slide (CAS). Data—Peru: 28 mi W of Jaén, Cajamarca, matured VI-1955 (E. S. Ross).

Description.—Appearance: Small, alate; pale tan throughout except for pale gold cranium and blackish eyes. Color details (in alcohol): Cranium pale, translucent gold; brain and muscles visible through surface, subdermal pattern is mottled rust brown. Eyes blackish lavender. Antennal segments uniformly light brown with creamy white membranes. Body and legs various shades of pale tan, prothorax and pterothorax uniformly tan. Wings pale tan, without whitish apices. Terminalia translucent pale amber; cerci mottled with rust red, lobe of left cercus especially so. Dimensions (on slide): Body length 7.5 mm; forewing length 5.2 mm, breadth 1.4 mm.

Important anatomical characters.—As figured and described for the genus.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Small, pale tan throughout with light amber head. Color details: Cranium light amber, lacking pattern; internal organs visible through translucent surface. Eyes black. Antennae pale amber throughout, 18-segmented. Body and leg sclerites dorsally translucent pale tan, membranes creamy white; mid- and hind legs and caudal abdominal segments slightly mottled with brown. Entire venter of body creamy white except for light brown lateral thirds of abdominal sternites 8 and 9. Cerci dark brown due to superficial mottling. Body length 9.5 mm.

Paratypes and parallotypes—Hundreds of adults reared from a single topotypic culture. Distributed in CAS, USNM, BMNH and MSUM.

Biology—The type colonies were found under logs on ground beneath *Acacia* trees on flats near a river. Vegetation was arid-tropical in spite of being in an upper tributary region of the Amazon.

Genus *Mesembia* Ross

Mesembia Ross, 1940a:12.—Davis, 1940b:532; 1940a:537.—Ross, 1940b:643; 1944:437; 1984b:20.—Alayo 1979:4; Mariño and Marquez, 1984:91.—Mariño, 1994:234.— Szumik, 1996:51 (in cladogram).

Type species.—*Oligotoma hospes* Myers, 1928.

Distribution.—Cuba.

Description.—Appearance: Shades of tan and brown, winged. Cranium elongate; eyes small, separated by four to five eye-widths; antennae unicolorous light brown; mandibles acutely pointed, without flange on inner subapical arc. Forewing with one RP-MA cross-vein and one or two faint MA-MP cross-veins. Tenth abdominal tergite not cleft to its base; inner margin of 10 L sclerotic, at times elevated; left process (10 LP) simple, tapered, straight or curved leftward; right hemitergite (10 R) triangular, caudally narrowed, terminated as an apically truncate process (10 RP). Epiproct sclerite (EP) narrow, fused to inner margin of 10 R. Hypandrium (H) weakly sclerotized, caudally ex-

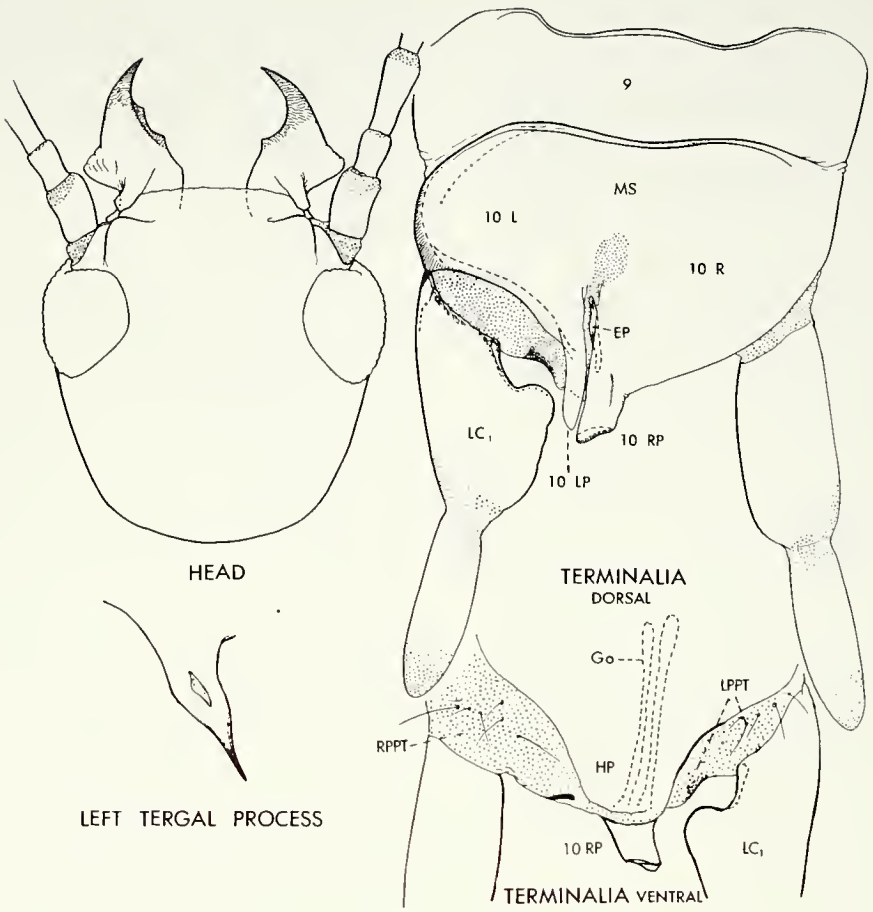

FIGURE 3. *Ectyphocerca aureata* Ross, new species, holotype. Type locality: Peru: 28 mi W of Jeán, Cajamarca. Note: Detail of left tergal process as viewed from a lateral aspect.

tended as a broad, apically-rounded process (HP). Left paraproct (LPPT) usually weakly sclerotized except along contact with H; not narrowed and extended dorsad on caudal margin; right paraproct (RPPT) with only a small fragmentary sclerite. Basal segment of left cercus (LC_1) robust, gradually expanded caudally on inner side, not abruptly lobed; bearing coarse echinulations; apical segment fused to LC_1 in one species (*M. venosa*).

Females.—No available specimens.

Discussion.—As an increasing number of specimens of species originally assigned to *Mesembia* have become available, I have decided to limit the genus to those restricted to Cuba. Most others are treated in a new genus occurring in southeastern Mexico, Honduras, Guatemala and Hispaniola. These species are characterized by a completely cleft tenth tergite, a broader epiproct separated from 10 R by a membranous interval, in one species by well sclerotized paraprocts, and an abruptly, apically-lobed, tubular, basal segment of the left cercus.

KEY TO SPECIES OF *MESEMBIA*

(Males)

1. Paraprocts well sclerotized. Distal segment of left cercus fused to basal segment ..... *venosa*
— Paraprocts weakly sclerotized, almost entirely membranous. Left cercus two-segmented 2
2. Left tergal process (10 LP) almost straight; right process (10 RP) elongate, parallel-sided, distally truncate. Soledad, Santa Clara ..... *hospes*
— 10 LP curved leftward, sickle-shaped; 10 RP broadly tapered, apex transversely carinate ventrad. Pico ..... *pico*

Mesembia hospes (Myers)

(FIGURE 4)

Oligotoma hospes Myers, 1928:89.

Mesembia hospes (Myers), Ross, 1940a:12.—Davis, 1940b:532.—Ross, 1940b:644; 1944:439; 1984b:20.—Mariño and Marquez, 1984: 93 —Mariño, 1994:238 (key).—Szumik, 1996:51 (in cladogram).

Holotype.—Male, MCZ. Data.—Cuba: Soledad, Santa Clara, 10-II-25 (J. G. Myers).

Discussion.—This rather large species was collected only once in a huge colony covering the trunk and lower branches of a large physic bean tree (*Cassia fistula*). Two males from this original occurrence are in my collection (CAS), from the Crampton collection of embiids. I fully described this species in 1940b:644.

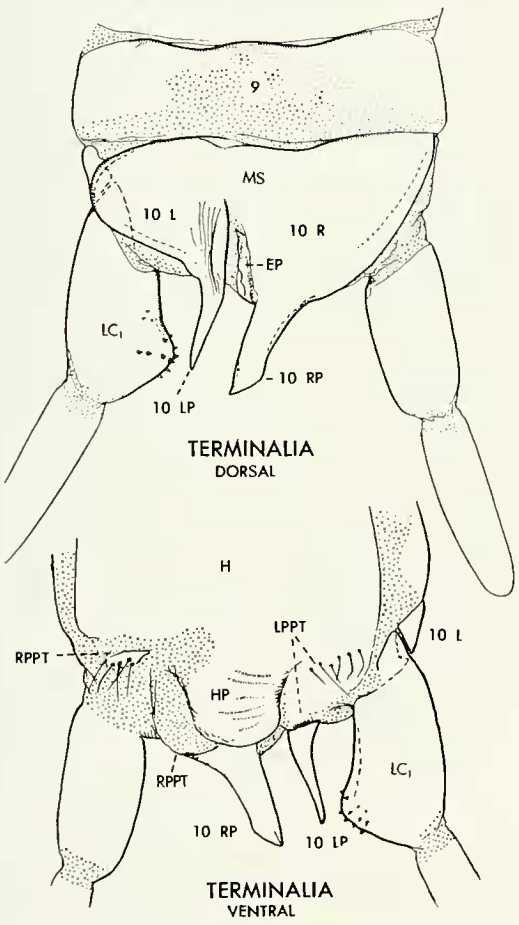

FIGURE 4. *Mesembia hospes* (Myers), topotype. Type locality: Cuba: Soledad, Santa Clara.

Mesembia pico Ross

new species

(FIGURE 5)

Holotype.—Male on slide, CAS. Data.—Eastern Cuba: Pico, 1800 m, 2-2-82 (P. Beron).

Description.—Appearance: Rather small, alate; uniformly golden brown except for dark amber head and darker brown prothorax, forelegs, and terminalia. Color details (in alcohol): Cranium dark amber, lacking pattern but faintly clouded with medium brown; eyes black; antennae and mouthparts medium brown. Prothorax and forelegs mahogany brown, membranes almost concolorous. Pterothorax mahogany brown; scuta largely amber, especially caudad, dorsal membranes paler than ventral. Wing bands pale brown, cross-veins white when crossing intervenal hyaline stripes. Abdomen light brown mottled with rust brown except for dark brown terminalia, cerci uniformly mottled rust brown. Dimensions (on slide): Body length 8.5 mm; forewing length 6.4 mm; breadth 1.5 mm.

Important anatomical characters.—As illustrated. Most significant is the strongly arcuated 10 LP and the complex apex of 10 RP.

Mesembia venosa (Banks)

(FIGURE 6)

Oligotoma venosa Banks, 1924:421.

Saussurella venosa (Banks), Davis, 1939a:574.

Saussurembia venosa (Banks), Davis, 1940a:191.—Ross, 1940b:648.

Anisembia (*Anisembia*) *venosa* (Banks) Ross, 1944: 446.

Mesembia venosa (Banks) Ross, 1984b:20.—Mariño, 1994:239 (key).

Anisembia (*Anisembia*) *schwarzi* Ross, 1940b:652. (Holotype, USNM. Data.—Cuba: Cayamas, Santa Clara); 1944:446; 1984b:20 (as a synonym of *A. venosa*).

Holotype.—Male on slide, MCZ. Data.—Cuba: Santa Clara (Baker).

Discussion.—*Mesembia venosa* probably occurs in the same locality as *M. hospes,* a place once visited by researchers from Harvard University. The holotype of *M. venosa*, and that of its probable synonym, *M. schwarzi*, was treated by me (1944:446). Associated illustrations are republished at this time.

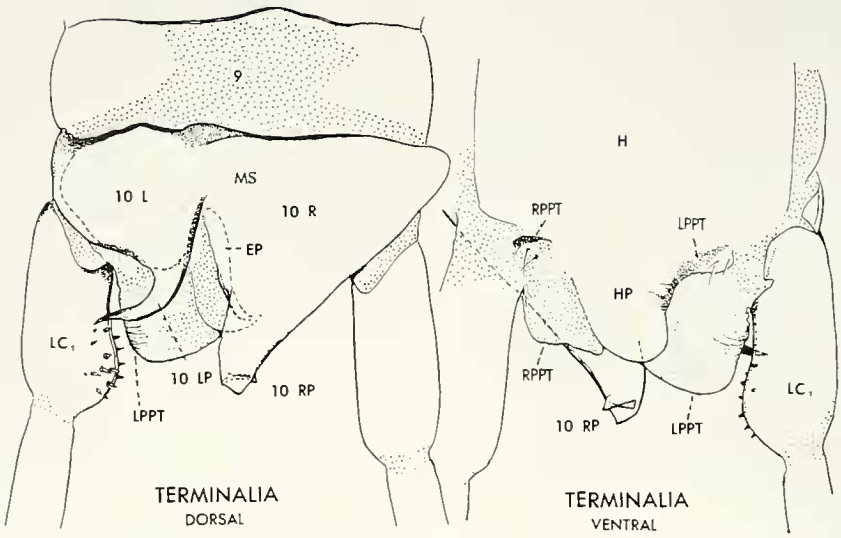

FIGURE 5. *Mesembia pico* Ross, new species, holotype. Type locality: Cuba: Pico, 1800 m elev.

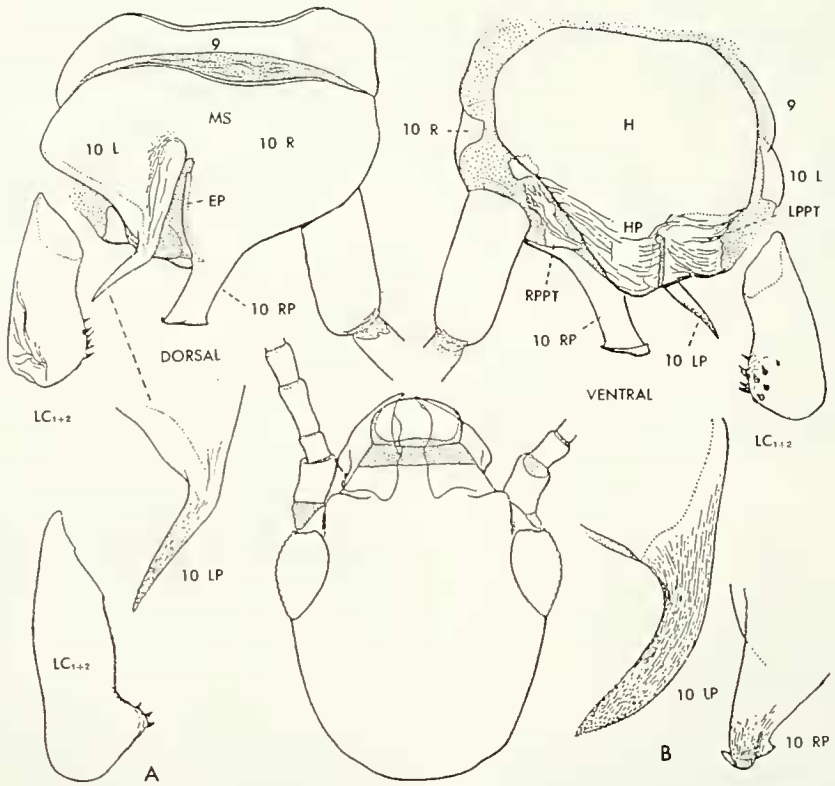

FIGURE 6. *Mesembia venosa* (Banks) holotype. Type locality: Cuba: Santa Clara. Forewing, A and B left cercus and processes of holotype of synonym *Anisembia* (*A.*) *schwarzi* Ross. Type locality: Cuba: Santa Clara.

There remains a possibility that the two names apply to two distinct species, as suggested by differences in the left and right tergal processes. Both differ from *M. hospes* and *M. pico* in fusion of the left cercus segments.

Genus *Phallosembia* Ross

new genus

Type species.—*Phallosembia andina* Ross, new species, by present designation.

Name basis.—Greek *phallos* = penis, in reference to the prominent, sclerotic margins of the ejaculatory duct (GO).

Distribution.—Western South America: from sea level to high Andean localities.

Description.—Males very small (body length averaging 6 mm), slender, apterous or alate; uniformly black except for whitish bands between thoracic somites. Cranium oval; eyes small, facet interstices pigmented. Left mandible with a prominent, subapical, acute, flange (absent on right mandible); outer basal angles obtusely produced. Submentum weak, broader than long. Wings, when present, with RBS slanting into costal margin at mid-length of wing. Veins mostly represented by setae; cross-veins absent except for one between RBS and RP. Costal margin brown, radius marginal lines purple. Tenth abdominal tergite not cleft to base, its left process (10 LP) much smaller than 10 RP, apically twisted instead of straight and flat. Right process (10 RP) broadly truncate, apex narrowly folded ventrad. Epiproct sclerite (EP) mostly concealed beneath inner margin of 10 R, sclerotic, its apex hooked to right, closely paralleling 10 R but not fused to it. Left paraproct sclerite (LPPT) narrow, sclerotic, its apex curved dorsad between 10 LP and base of LC_1, is globose and microspiculate. Right paraproct (RPPT) represented by broad sclerotic fragments. Ejaculatory duct bordered by two conspicuous, parallel, rod-like, sclerotic structures (GO). Basal segment of left cercus (LC_1) cylindrical, without an abrupt inner lobe, only a gradually echinulate swelling.

Component species.—In addition to the new species described below, this genus includes a related alate new species, or race, from Ecuador's Santa Elena Peninsula, and a more distinct new species from an arid Andean locality east of Olmos, northern Peru. A small series of a new species also was collected under stones near the bridge crossing Peru's Rio de la Pampas, Prov. Apurimac.

Habitat.—The typical habitat appears to be under stones in arid regions, however, one population webbed hanging moss in a wet cloud forest, 2740 m elev., north of Loja, Ecuador. On Ecuador's SW coast, including Puna Island, specimens apparently conspecific with topotypes colonize bark crevices in arid, thorny jungle with scattered Ceiba trees. Cultures produced adults throughout a year.

Phallosembia andina Ross

new species

(FIGURE 7)

Holotype.—Male, on slide, CAS. Data.—Ecuador: 5 km N Catamayo, Prov. Loja, 1400 m elev., matured in culture 10-V-91 (E. S. Ross).

Description.—Appearance: Small, slender, apterous body and legs varied shades of chestnut brown, prothorax and forelegs slightly darker; whitish membranes between pro- and mesothorax, appear as a band to the unaided eye; cranium blackish brown, dull due to microsculpture; antennae and cerci unicolorous dark brown. Dimensions (on slide): body length 6.5 mm.

Important anatomical characters.—Cranium strongly tapered and rounded caudad, lacking pattern; eyes rather small, not abruptly rounded, facet-interstices pigmented; antennae unicolorous to apex except for darker basal segment; mandibles with outer sides sharply angulate, apices narrowly acute, inner-apical arc of left mandible with an acute flange; submentum concolorous with gula, anterior margin blending to membrane. Tenth abdominal tergite not cleft basad, or having a sclerotic line dividing hemitergites. Left process (10 LP) membranous on inner base, sclerotic on outer base, apical portion short, transparent, appearing to be obsolete. Right process (10 RP) broad, parallel-sided, apex diagonally truncate. Epiproct (EP) sclerite darkly sclerotic, hooked beneath 10 RP to apex. Ninth sternite (H) submembranous on right side; its process (HP) elongate, apically truncate, transversely strigose. Ejaculatory duct bordered by elongate sclerites (gonapophyses = GO). Left paraproct (LPPT) completely fused to HP and darkly sclerotized on inner side, this dark line continues dorsad and terminates as a globose, darkly microspiculate patch. Right paraproct (RPPT) large and well sclerotized. Base

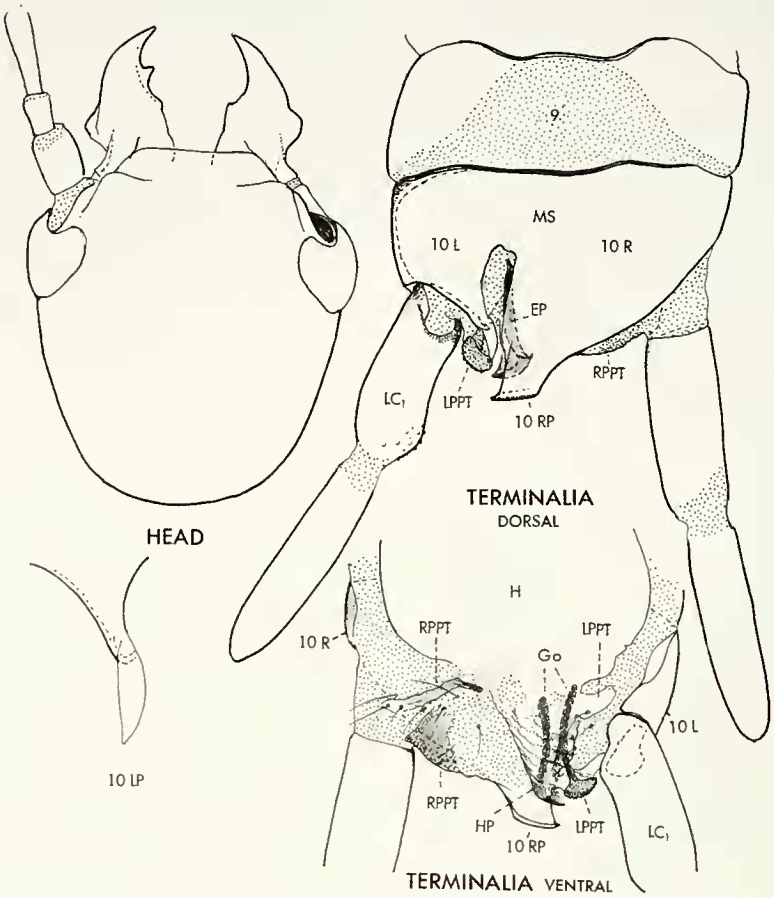

FIGURE 7. *Phallosembia andina* Ross, new species, holotype. Type locality: Ecuador: 5 km N Catamayo.

of left cercus with a sclerotic, outer flange; inner-apex weakly lobed, bearing long echinulations; other cercus segments normal, darkly pigmented.

Allotype.—Female, in alcohol, reared in type culture. Same disposition as holotype.

Description.—Small, slender; body length 8.25 mm. Cranium golden brown, lacking pattern; brain, visible through derm, creates illusion of a pale spot. Antennae unicolorous brown with whitish membranes, 18-segmented. Mouthparts medium brown. Prothorax translucent tan; posterior pronotal plate, and membranes creamy white; meso- and metanota glossy, chestnut brown, blending to pale tan caudally; meso-pleurae purple brown anteriorly; ventral sclerites of thorax paler than scuta or pleura; legs varied shades of chestnut brown. Abdominal sclerites chestnut brown, darkening caudad; all membranes whitish tan thus giving the insect a banded appearance; cerci concolorous with tenth abdominal tergite.

Paratypes and parallotypes.—Numerous males and females reared from the holotype's culture. Also from nearby San Pedro Bendito. Deposited in CAS, USNM, NMQ and MUSM.

Biology.—The type culture was collected under small stones in an arid canyon with dense mesquite trees and scattered cacti. An alate n. sp. of *Chelicerca* occurred under the same stones.

TRIBE ISOSEMBIINI

Isosembia Ross

new genus

Type species —*Mesembia aequalis* Ross, 1944, by present designation.

Name basis.—Greek *isos* = equal.

Distribution.—South America: Southeastern Brazil.

Description.—Males: Small, stout, body length averaging 6–7 mm; always alate; dark mahogany brown with contrasting golden prothorax. Head elongate oval; eyes small, facet interstices not pigmented; mandibles small, short, outer side obtuse; inner-apical arc of left mandible with an angulate flange, that of right mandible smoothly arcuate; submentum weak, quadrate. Wings with RBS merging with C before apex of wing; RP and most of MA sclerotized, all other longitudinal veins represented only by setae; cross-veins present only between RBS and RP; hyaline stripes narrow, abruptly margined. Hind basitarsi elongate, plantar setae few, variable in shape and length, those in terminal half in a single row. Tenth abdominal tergite with basal portion and sides exceptionally long, straight; not entirely medially cleft to base, cleft margins weak. Left process (10 LP) broad, spatulate, translucent-amber but conspicuous to apex. Caudal margin of right hemitergite (10 R) straight, abruptly curved caudad to form a long, parallel-sided process (10 RP) which is slightly flared and diagonally truncate at apex. Epiproct sclerite (EP) small, elongate, closely aligned or fused with inner side of 10 R. Ninth sternite (H) narrow, unevenly sclerotized, right half largely membranous; its process (HP) medial, broad, apically rounded, transversely wrinkled, right half membranous. Ejaculatory duct sclerites small, inconspicuous. Left paraproct (LPPT) very elongate, similar in size and appearance to HP, broadly fused to H at base; right paraproct (RPPT) well sclerotized, completely separated from H and HP by a membranous interval. Basal segment of left cercus cylindrical at base; with an abrupt, echinulate, apical, inner lobe; basal rim sclerotized, flanged on outer side. Basal segment of right cercus cylindrical, basal rim circular; apex of segment broader than base, evenly sclerotized; apical segments of cerci articulated, equal, concolorous with basals. Females conspicuously banded due to creamy white intersegmental areas contrasting with mahogany brown sclerites; caudal half of pronotum creamy yellow; terminal three abdominal segments darker, unbanded; cerci entirely dark.

Discussion.—This genus is characterized by the nearly perfect symmetry of the male terminalia. The tenth tergite is exceptionally long-sided and essentially uncleft except for a very short, weakly-margined cleavage between the inner bases of the processes. The tergal processes are almost equal in size and shape except for the truncate apex of the right process; they are also very closely aligned near the center line of the tergite. Hypandrium process medial, paraprocts exceptionally symmetrical, well developed and sclerotized. *Isosembia* is most closely related to *Stenembia,* but may be considered somewhat more generalized. It is the only anisembiine genus thus far encountered in southeastern Brazil.

Component species.—Only the type species is known.

Isosembia aequalis (Ross)
new combination

(FIGURE 8)

Mesembia aequalis Ross, 1944:438, figs. 64–66.

Holotype.—Male, on slide, USNM. Data.—Brazil: Nova Teutonia, near Seara, Santa Catarina (F. Plaumann).

Description.—Males may be recognized by their generic characters.

Biology.—Occurs in lichens and bark flakes of heavily shaded, dense tropical forest in highlands of southern Brazil.

Additional records.—Brazil: Ridge immediately north of Seara, 600 m, Santa Catarina; series of adults reared in a culture I collected in 1964.

TRIBE SAUSSUREMBINI

Genus *Saussurembia* Davis

Saussurella Davis, 1939a:573 (name preoccupied).

Saussurembia Davis, 1940a:191; 1940c:537.—Ross, 1940b:647; 1944:435; 1992:126.

Type species.—*Saussurembia davisi* Ross [This is a new name for a series which includes a specimen misidentified by Davis (1939a) as *Embia ruficollis* Saussure (1896), which he used as the type species of this genus].

Distribution.—Costa Rica and Panama.

Description.—Males: Alate or apterous, rather small, dark, shining blackish brown with golden prothorax; wing apices and apical tarsal segments white in one species. Tenth abdominal tergite not entirely medially cleft to base but with a sclerotic line continuing from inner margin of left process (10 LP)

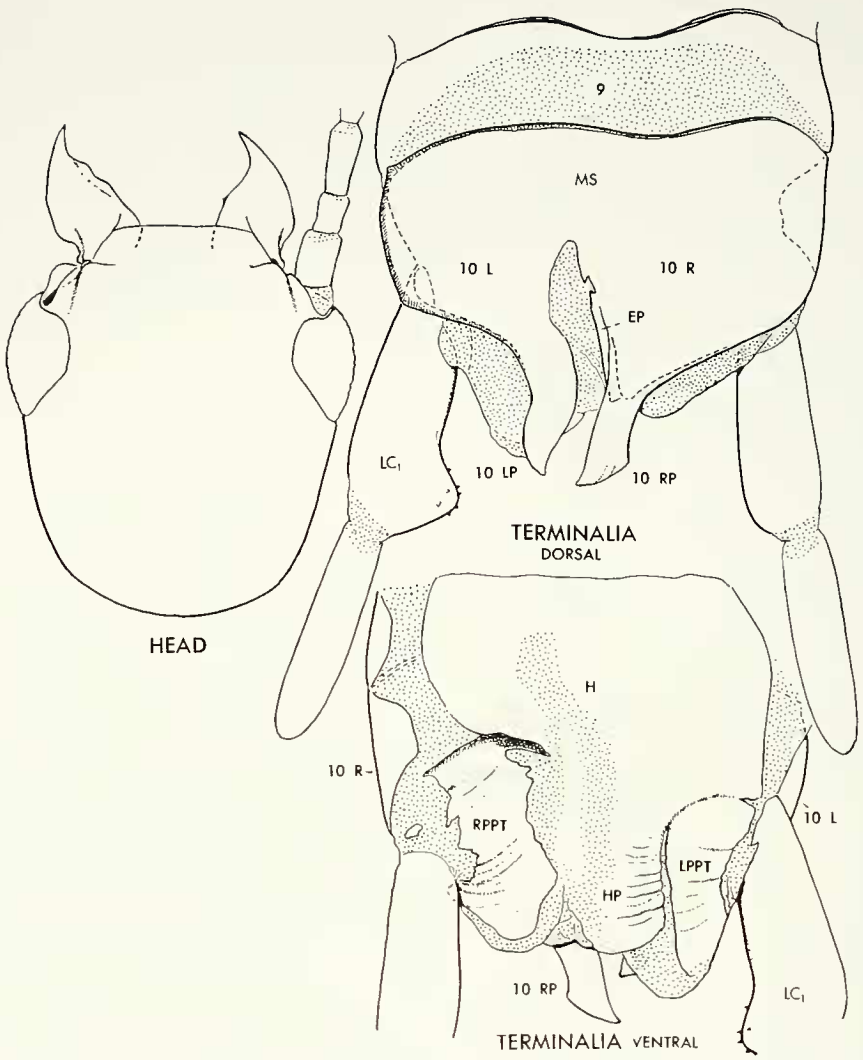

FIGURE 8. *Isosembia aequalis* (Ross), topotype. Type locality: Brazil: Nova Teutonia, Santa Catarina.

almost to basal margin of tergite. Left hemitergite (10 L) small, transverse, its process (10 LP) broad-based, tapered straight caudad with margins sclerotic; apex acute, simple but twisted. Right hemitergite (10 R) extensive, evenly but weakly sclerotized; inner apex abruptly narrowed to form a sclerotic, parallel-sided, downward curved, truncate process (10 RP). Entire inner side of 10 R basad of process thickened. I have decided that this is the epiproct sclerite (EP) completely covered by inner edge of 10 R. Ninth sternite (H) uniformly sclerotized; its process (HP) large, broad to apex, which is asymmetrically truncate or rounded and simple. Gonapophyses (GO) sclerotized only at aperture. Left and right paraprocts (LPPT and RPPT) with sclerotization reduced, irregular in outline; left paraproct not produced caudo-dorsad. Both cerci similar, i.e., basal segment of left lacking lobes or echinulation.

Discussion.—Davis (1940b) designated *Embia ruficollis* Saussure, 1896, as the type species of his genus *Saussurembia*. However, my examination of the holotype of *E. ruficollis* (not seen by Davis) revealed that it is a species of the genus *Chelicerca* Ross and thus not closely related to the species represented by Davis's specimens. Actually, the Davis specimens represent an undescribed species belonging to the valid generic concept *Saussurembia* defined by Davis. I named and described this species as *S. davisi* based on specimens I collected in Costa Rica.

Saussurembia colonies occur in mossy bark flakes of living trees, under flat leaves of vines on bark, and on one occasion, in the papery nest of a species of the ant genus *Crematogaster*.

Only two species are known: the type species, *S. davisi* Ross, which occurs both in Costa Rica's highlands and Pacific lowlands; and *S.albicauda* Ross occurring on tree bark in the Republic of Panama. I have transferred species incorrectly assigned to *Saussurembia* by Davis (1940b) and by me (1944) into other genera (Ross, 1992). In this contribution I described the female and cited localities in which *S. davisi* occurs.

Saussurembia davisi Ross

(FIGURE 9)

Oligotoma ruficollis Navás (not Saussure), 1924:62.—Friederichs, 1934:417.

Saussurella ruficollis Davis (not Saussure), 1939a:573.

Saussurembia ruficollis Davis (not Saussure), 1940: 191—Ross, 1944:435.

Saussurembia davisi Ross, 1992:127.

Both Navás and Davis misidentified a male specimen from Costa Rica (coll. Paul Serre, 1920; Mus. Hist. Nat. Paris) as Saussure's *Embia ruficollis*. I have studied this specimen, as well as the type of *S. ruficollis,* and am able to confirm their misidentifications. *Embia ruficollis* Saussure is a member of the genus *Chelicerca* Ross and the Serre specimen represented an undescribed species I treated under the new name *S. davisi*. A more recently collected Costa Rican specimen was selected as the holotype of *S. davisi* because of its precise locality data and my large series of specimens, including females.

Holotype.—Male, on slide, CAS. Data.—Costa Rica: Hacienda de la Pacifica, near Bagaces, 200 ft. elev., matured in culture 16-XII-1976 (E. S. Ross).

Description.—Appearance: Similar to that of *Pararhagadochir trinitatis,* but much smaller and with tips of wings narrowly white.

Large series reared from many Costa Rican localities show little variation in spite of great altitudinal range. In certain localities all males may be either apterous or alate, however, in others both morphs occur in the same locality. Choice of colony site is also broad — either on tree bark or in crevices in road and trail banks. It is probable that the range of the species has been extended by man.

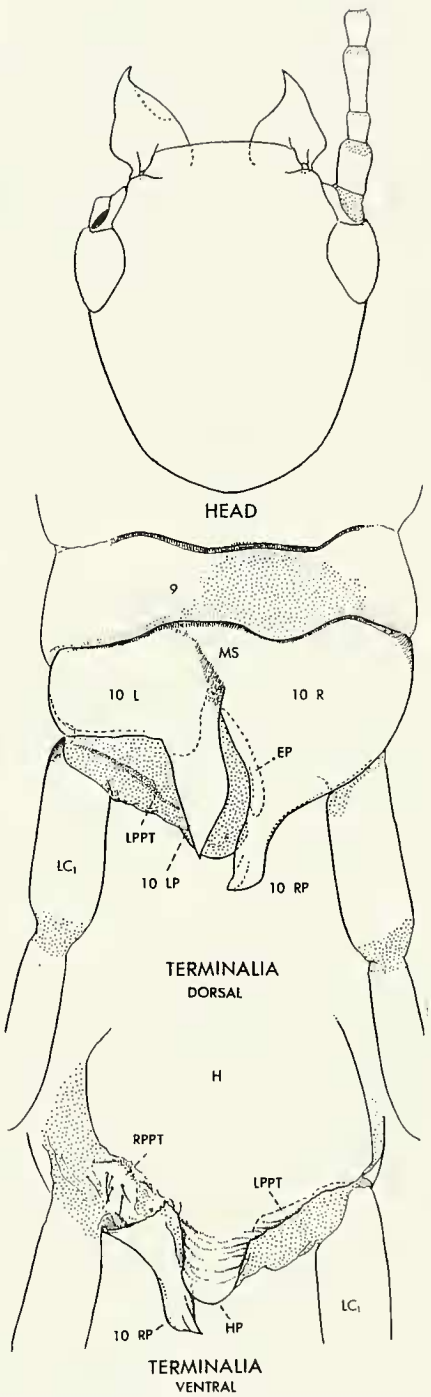

FIGURE 9. *Saussurembia davisi* Ross, holotype. Type locality: Costa Rica: Hacienda de la Pacifica, near Bagaces.

Saussurembia davisi is closely related to *S. albicauda* Ross, but is immediately distinguished by the dark, instead of white, color of the distal segment of the cercus of both sexes.

Saussurembia albicauda Ross

Saussurembia albicauda Ross, 1992:127.

Holotype.—Male, on slide, CAS. Data.—Panama: Rio Tabassará, Pan-American Highway, Veraguas, 1000 ft. elev. (E. S. Ross).

Discussion.—*Saussurembia albicauda* is almost identical to *S. davisi* in appearance and coloration except for the white apical segments of the cerci. The most obvious anatomical distinctions involve the shape and proportions of the tergal processes. In *S. albicauda* the left process (10 LP) is longer and the tergal cleft narrower and extended more basad than in *S. davisi*; the right process (10 RP) is broader and shorter.

TRIBE ANISEMBIINI

Genus *Anisembia* Krauss

Anisembia Krauss, 1911:74.—Enderlein, 1912:109 (in error as a synonym of *Oligotoma* Westwood and *Haploembia* Verhoeff).—Chamberlin, 1923:346.—Davis, 1940b:531; 1940c:537.—Ross, 1940b:649; 1944:445; Ross, 1984a:84; 1984b:27.—Szumik, 1996:51 (in cladogram); 1998:7 (in error).

Type species.—*Embia texana* Melander, 1902, by original designation.

Name basis.—Greek *anisos*, unequal. In reference to asymmetry of the terminalia.

Distribution.—United States: South-central states, especially eastern Texas and northeastern Mexico southward at least to Victoria.

Description.—Males: Rather small, averaging 8 mm in length; apterous or alate (at times in same colony). Dark brown with head, prothorax, and profemora golden yellow; white between pro- and mesothorax. Head oval; eyes small; antennae uniformly dark brown; mandibles short, outer margins continuously arcuate; inner-apical arcuation of left mandible with an acute, conspicuous flange; inner arcuation of right mandible smooth; submentum broader than long, weakly sclerotized. Wings, when present, relatively short, darkly pigmented, costal margin narrowly white; RBS slanted toward costal margin but not merging with it; all veins behind RBS indicated only by lines of setae and well-defined pigment stripes; cross-veins entirely lacking behind RBS; apterism in some males manifested by short wing pads or a complete absence of pads. Tenth abdominal tergite incompletely cleft. Left hemitergite (10 L) rather large with all margins dark, sclerotic; inner margin continued forward to basal margin of tergite 10, not elevated, straight, sclerotic continued caudad as the straight inner margin of left tergal process (10 LP) which is weakly sclerotized on its outer apex, and slightly curved mesad. Right hemitergite (10 R) large, its basal margin well defined; outer margin weak, evenly slanted and continuous with outer side of process (10 RP) which isn't abruptly formed or apically-truncate. Epiproct sclerite (EP) broad, triangulate, curved ventro-laterad beneath right hemitergite. Ninth sternite (H) large, quadrate, evenly sclerotized; its process (HP) short, truncate, weak. Left paraproct sclerite (LPPT) narrow, arcuate, basally fused to H; right paraproct a small, rudimentary sclerite (RPPT) next to H. Basal segment of left cercus cylindrical with a conical, sparsely echinulate, inner-apical lobe; distal segment a short setose lobe partially fused to basal segment, line of fusion membranous. Right cercus normal but with apical segment short and concolorous with basal.

Females.—With coloration paralleling that of males. Lateral, arcuate areas of eighth sternite very dark; intervening area clear membrane. Ninth sternite darkly pigmented except for large, clear, equilaterally-triangulate, baso-medial area. Segments of cerci concolorous, exceptionally short.

Discussion.—*Anisembia* isn't very closely related to other anisembiine genera. Principal distinctions of males are: the non-ridged, straight, composite inner margin of the left hemitergite and process; broad, triangulate epiproct (EP); narrow form of the left paraproct sclerite; the flanged left mandible, and reduced wing venation. I consider the genus monotypic. Other species previously assigned to it were treated in Ross (1984b).

Anisembia texana (Melander)

(Figure 10)

Embia texana Melander, 1902:19.—Friederichs, 1906:238.

Anisembia texana (Melander) Krauss, 1911:74.—Chamberlin, 1923:345.—Davis, 1940f:532.—Sanderson, 1941:60 (record) —Shetlar, 1973:205 (record); Ross, 1984a:84; 1984b:28.

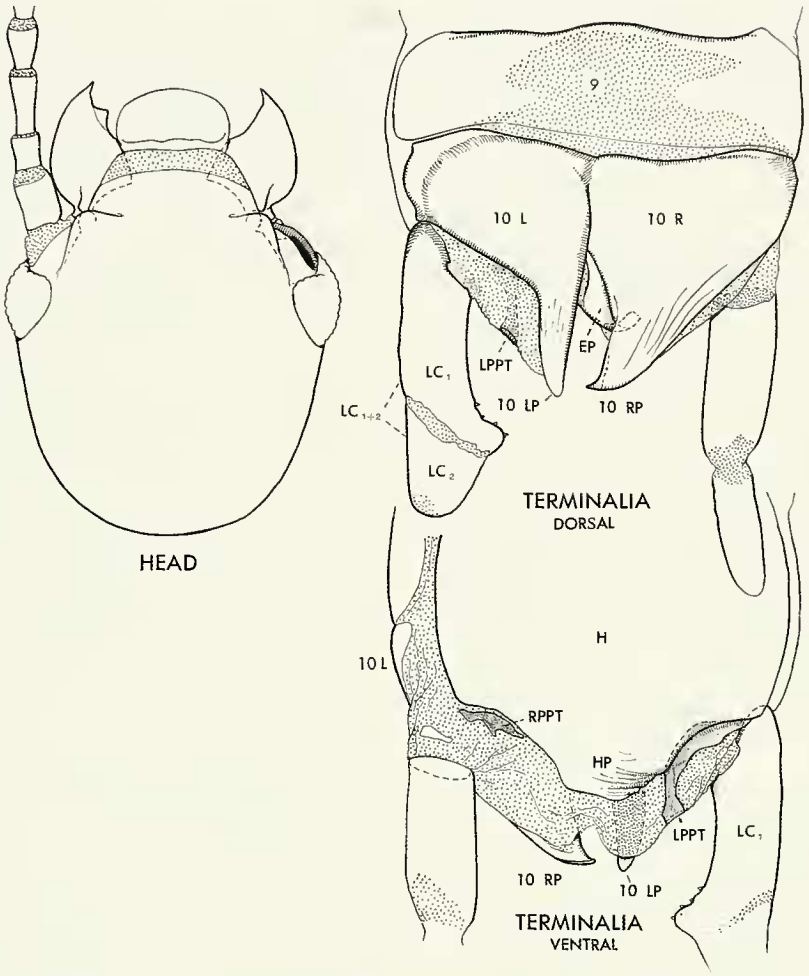

FIGURE 10. *Anisembia texana* (Melander), specimen from Buffalo, Texas.

Oligotoma texana (Melander), Enderlein, 1912:92, 109. —Mills, 1932:648.

Anisembia (*Anisembia*) *texana* (Melander), Ross, 1940b:650; 1944:445; 1984:84; Choe, 1994:971 (biology); Szumik, 1996:51 (cladistics).

Holotype.—Nymph, MCZ. Data.—Austin, Texas (A. L. Melander).

Biology.—In Arkansas, Mississippi, Louisiana, and northeastern Texas, colonies of *A. texana* most often occur in the outer bark of standing trees and fence posts. In drier zones, stone cover or dead bark in shaded thickets are utilized. In the Wichita Mountains of southwestern Oklahoma, colonies occur under and on the edges of stones fully exposed to the sun on open south-facing slopes of hills. In humid regions males usually are alate, in arid regions they are apterous. Each colony contains a single female and her brood. At least in its northern range, only one generation develops per year. Mating must occur in early summer and, in Louisiana, first and second instar nymphs were present during mid-August. No males had survived by that date. In Mexico *A. texana* colonies were found only under stones in semi-arid habitats. Choe (1994) presented additional biological information. The species is parasitized by a sclerogibid wasp, *Probethylus schwarzi* Ashmead in Comanche Co., Oklahoma (Shetlar, 1973).

Genus *Glyphembia* Ross
new genus

Type species.—*Mesembia chamulae* Ross, by present designation.

Name basis.—Greek *glypho* = carve, engrave.

Distribution.—Southern Mexico, Belize, Guatemala, Hispaniola (including two amber fossil species, Oligocene).

Description (Males).—Appearance: Highly variable, apterous or alate (usually), body length 5–13 mm. Left mandible never with a flange on subapical curvature. Costal and apical margins of wings never white. Tenth tergite cleft to base, cleft membrane extended leftward at base of 10 L; 10 LP always simple, tapered at times truncate, in one case thornlike, in another distally expanded and striate; 10 RP simple. Epiproct sclerite (EP) broad, usually triangulate, separated from inner margin of 10 R except for a broad basal attachment. In a few species paraprocts (LPPT and RPPT) may be well sclerotized, but usually they are slender fragments fused to the hypandrium (H); without lobes or processes. Gonapophysis sclerotization (GO) absent. Basal segment of left cercus (LC_1) usually elongate, cylindrical, with an abrupt, inner-apical, echinulate lobe; in other species the distal segment is "fused" to the basal (in one species as an intraspecific variation).

Females.— Not studied for generic characters.

Discussion.—Heretofore, most species assigned to this genus were placed in *Mesembia* (Ross, 1984b). *Mesembia* is now restricted to Cuban species, all of which have only a partially cleft tenth tergite, therefore no membranous areas at base. Also significant, the epiproct sclerite of *Mesembia* is very slender and its full length appears to be fused with the inner margin of the right hemitergite. This is in contrast to the broad, partially separated epiproct sclerite of *Glyphembia*.

At this time this potentially very large genus is divided into the following species-groups:

CHAMULAE GROUP

Characterized by a two-segmented left cercus, simple tergal processes, and vestigial paraproct sclerites fused to caudal margins of the hypandrium.

Glyphembia chamulae (Ross)

new combination

(FIGURE 11)

Mesembia chamulae Ross, 1984:21, fig. 6.

Holotype.—Male, on slide, CAS. Data.—

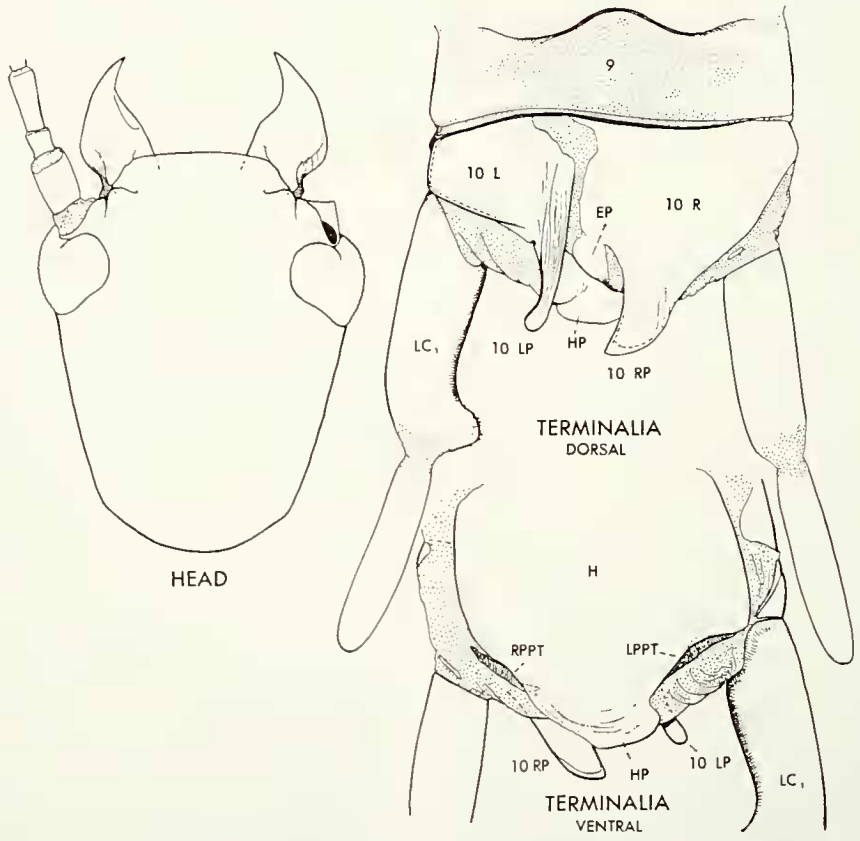

FIGURE 11. *Glyphembia chamulae* Ross, holotype, republished from Ross, 1984b. Type locality: Mexico: Parje Voites, Mun. Zinacantan, Chiapas.

Mexico: Parje Voites, Mun. Zinacantan, Chiapas, 4500 ft. elev. (E. S. Ross).

Discussion.—This, perhaps the largest, most blackish species of the genus, is represented by many cultured specimens (CAS) from pine forest habitats in the vicinity of San Cristóbal de las Casas, Chiapas.

Glyphembia juarenzis (Mariño and Márques)

new combination

Mesembia juarenzis Mariño and Márquez, 1984:92, 4 figs.

Holotype.—Male, in alcohol, UNAM. Data.—Mexico: Puebla: Xilotepec de Juárez, 20-III-83, in light trap (H. Brailovsky).

Paratypes.—Eight topotypic males.

Discussion.—This, a valid species in the Chamulae Group, is apparently related to the many undescribed species in my collection from various regions in Mexico, Belize, and Guatemala which are distinguishable by size, coloration and only minor anatomical differences. Except for the following distinctively pigmented species, I will not propose additional new names until there is time to undertake a difficult, detailed study of *Glyphembia*.

Glyphembia teapae Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Chiapas, 4 mi. SW of Teapa, matured in culture VIII-X-81 (E. S. Ross).

Description.—Appearance: Small, alate, uniformly pale chestnut brown; head and terminalia darker; apical 2 or 3 antennal segments abruptly white, tips of cerci creamy white. Color details (in alcohol): Cranium dark chestnut brown; antennal segments 1–13 medium brown, 14 yellowish white, 15–17 white (complete number). Legs and body sclerites varied shades of chestnut brown with darker sutures; membranous areas concolorous with sclerites; mid- and hind coxae and trochanters creamy white. Tenth abdominal tergite pale yellow; left process (10 LP) largely dark brown, its downturned apex slender, pale amber yellow; right hemitergite (10 R) and its process (10 RP) dark brown on outer side. Epiproct sclerite (EP) blackish brown. Cerci smoke brown except for whitish tips of distal segments. Dimensions (on slide): Body length 6.2 mm; forewing length 4.2 mm, breadth 1.2 mm.

Important integumental characters.—Particularly significant is the straight, evenly tapered 10 LP with its distal fourth abruptly downturned; the straight outer side of 10 R continued on 10 RP which is broadly truncate and transversly arcuate across its apex. Basal segment of left cercus elongate, cylindrical; its lobe small, broadly conical.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Cranium dark chestnut brown, pattern faint, clypeus golden yellow. Basal two antennal segments yellowish, segments 3–14 blackish brown; 15 half brown, apically creamy white; 16–18 white (complete number). Anterior half of pronotum brown, posterior half becoming creamy white, continued laterally and on to fore-coxae to create a pale intersomital band. Mesothorax, including acrotergite, varied shades of mahogany brown, grading caudad in combination with coxae and trochanters to creamy white thus creating a second pale thoracic band. Metathorax entirely mahogany brown; pleura and hind coxae and trochanters creamy white. All legs otherwise dark mahogany brown. Abdomen dark mahogany brown except for tergite 1 which is creamy white, terga of somites 2–10 dark brown with anterior corners pale resulting in an overall "checkered" appearance. Cerci brown except tips of distal segments which are creamy white. Body length 9.0 mm.

Paratypes and parallotypes.—From type culture deposited in CAS, USNM and UNAM.

Biology.—Colonies were collected in bark of small trees near a hot spring's swimming pool. The species probably occurs in adjacent tropical forest.

Discussion.—Both sexes of *G. teapa* are readily recognized by their distinctive coloration—appearing black and white to the naked eye—found in no other species of the genus. The abruptly downturned, narrow apex of 10 LP is also distinctive.

Glyphembia amberica Ross

new species

(Frontispiece and Figures 12, 13)

Holotype.—Male, CAS, fossilized in Dominican Amber (Oligocene?).

Description.—Appearance: Small (body length about 4.5 mm), varied shades of brown; body very slender, wings relatively large. Cranium dark brown,

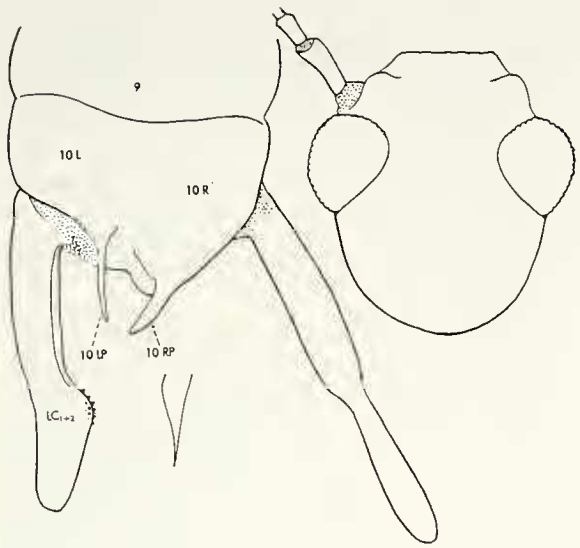

FIGURE 12. *Glyphembia amberica* Ross, new species, head and terminalia characters of holotype.

unicolorous; eyes large, inflated, separated by slightly more than an eye-width. Antennae uniformly brown to apex, 18-segmented (apparently complete). Legs exceptionally long; hind basitarsi slender, elongate. Terminalia small (unfortunately completely screened by a wing); however, the tergal processes and cerci are quite clear. Left tergal process (10 LP) is abruptly formed, very slender, elongate, simple; right process (10 RP) slender, slanted mesad, parallel-sided, narrowly pointed. Basal segment of left cercus exceptionally long and slender with a small echinulate lobe; apical segment reduced, completely fused to basal segment. Segments of right cercus exceptionally long, slender. Details of tenth tergite cleft and ventral structures not discernable.

Discussion.—Discernable characters in this specimen appear to be sufficient to assign this species to *Glyphembia,* perhaps in the *Chamulae* Group.

CATEMACOA GROUP

Medium sized species with distal segment of left cercus fused ("absorbed") to the basal segment which is distally lobed on inner side. Medial cleft of tergite 10 extended to base and there becoming broadly membranous. Epiproct sclerite (EP) broad, especially caudally; separated from 10 R, except for a basal attachment to 10 R. Left tergal process (10 LP) short, sclerotic, either apically truncate or sharply tapered, thorn-like. Right process broad, diagonally truncate.

Glyphembia catemacoa (Ross)

new combination

(FIGURE 14)

Mesembia catemacoa Ross, 1984b:23, fig. 7.

Holotype.—Male, on slide, CAS. Type data.—Mexico: Vera Cruz, 2 km E of Catemacoa, 350 m, matured in culture 25-VIII-80 (E. S. Ross). Bark of trees near a lake.

Discussion.—This species, described in detail in Ross, 1984b:23–24, is readily recognized by unique characters, especially the short, truncate 10 LP. Numerous cultured paratypes were designated.

An additional series from near Huixtla, Chiapas is puzzling because the locality is so distant from the type locality and separated by diverse topography (Huixtla is only about 40 km NW of Tapachula in the extreme SW corner of Mexico). Possibly the culture was mislabelled.

FIGURE 13. *Glyphembia amberica* Ross, new species, holotype. Dominican Amber (Oligocene?) Ross collection, CAS. Photo by Andrei Sourakov.

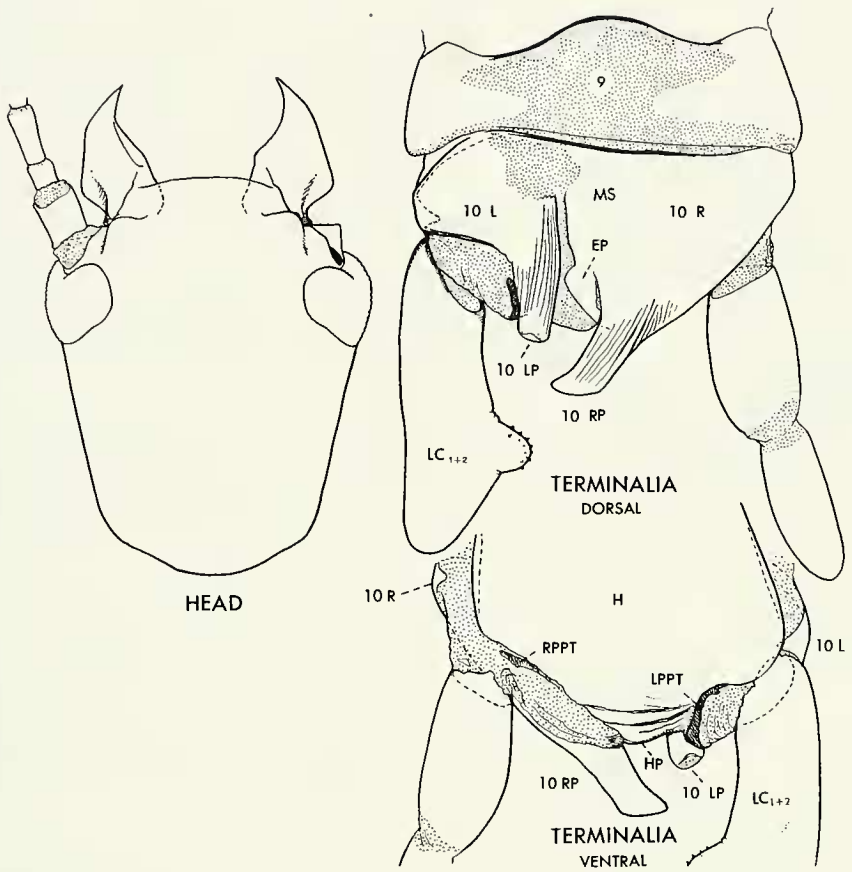

FIGURE 14. *Glyphembia catemacoa* (Ross). Holotype, after Ross, 1984b. Type locality: Mexico: 2 km E of Catamacoa, Vera Cruz.

Glyphembia guatemalae Ross
new species
(FIGURE 15)

Holotype.—Male, on slide, CAS. Data.—Guatemala: Cayuga, 100 ft. elev., matured in culture 11-VI-77 (E. S. Ross).

Description.—Appearance: Medium sized, alate; medium brown throughout except for yellowish basal half of antennae. Color details (in alcohol): Cranium mottled medium brown; eyes dark lavender with paler margins; antennal scape medium brown, segment 2 light brown, segments 3–8 dull lemon yellow, 9–14 dark brown, apex of distal segment pale; mouthparts brown. Body sclerites and legs varied shades of medium brown; all membranes, except those adjacent to pterothoracic scuta (which are creamy white) mottled with purple. Wing stripes light brown, hyaline stripes broad with irregular margins; longitudinal veins, except, Cu_{1a} sclerotized almost to apices; cross-veins white when crossing hyaline stripes. Terminalia various shades of medium brown except for left process which is brownish black. Dimensions (on slide): Body length 8.5 mm; forewing length 5.4 mm, breadth 1.4 mm.

Important integumental characters.—As figured. Of particular importance is the unique thorn-like, dorsally-projected left tergal process and the fused left cercus.

Allotype.—Female, in alcohol, with holotype data and disposition (reared in same culture).

Description.—Appearance: Moderately large; dark brown with pale banding between all body somites; antennal apices and coxae and trochanters of mid- and hind legs creamy white. Color details: Cranium mahogany red, pattern indistinct; eyes concolorous with cranium; antennal segments 1–16 various shades of dark brown, apical segments 17–20 pure white. Pronotum clear pale yellow, clouded with dark brown in anterior half; pleurites, sternites

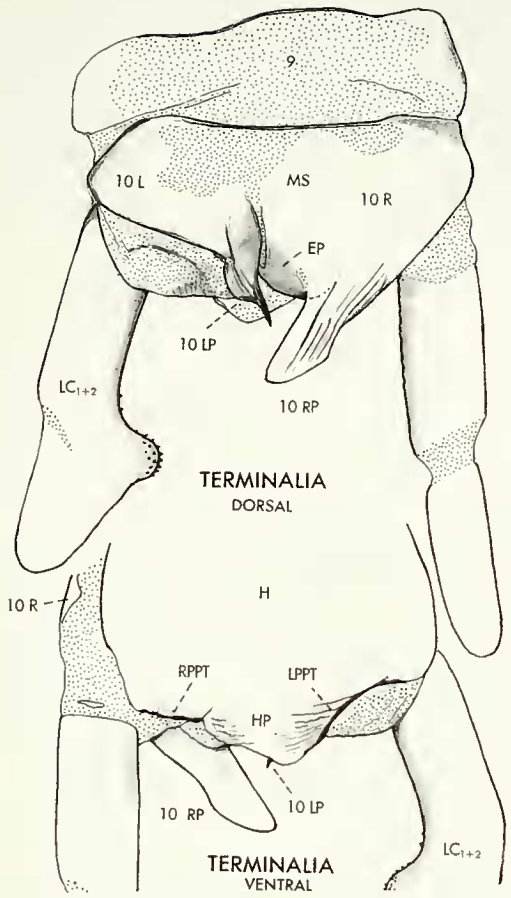

FIGURE 15. *Glyphembia guatemalae* Ross, new species, holotype. Type locality: Guatemala: Cayuga.

and cervical sclerites dark brown with adjacent membranes dark purple. Meso- and metanotal sclerites very dark, mahogany brown except for white posterior mesonotal plate; all associated membranes dark purple except those adjacent to the latter plate which are creamy white. The pale areas between the three thoracic somites form distinct whitish bands. Foreleg, except for membranes, entirely dark brown; mid- and hind legs similar except for yellow white coxae and trochanters. Abdominal terga rust brown, intervening membranes narrowly white; dorso-pleural membranes of somites 1–7 conspicuously creamy white; cerci, including membranes, mahogany brown. Body length 13.0 mm.

Paratypes and parallotypes.—Numerous topotypic adults reared in the type culture. Deposited CAS, USNM, BMNH, INBIO, and UNAM.

Other specimens examined.—A large series from a short distance east of the type locality, was also cultured.

Biology.—Stock of one series was collected in the bark of fence posts within the village of Cayuga, not far from recently cleared forest. At Lago Izabel colonies were very abundant and conspicuous on the bark of citrus trees within the resort of Miramonte. In cultures adults matured in great numbers between April and July; however, they could be encountered during any month of the year.

Discussion.—*Glyphembia guatemalae* is related to *G. catemacoa* of the Vera Cruz region and Chiapas, but readily recognized by its thorn-like 10 LP, more broadly membranous base of tergite 10, and LPPT completely fused to H and HP.

HAITIANA GROUP

Small species, apterous or alate (usually), with 10 LP very slender, abruptly turned mesad, 10 RP acutely pointed instead of truncate; HP narrow, its apex rounded, somewhat globular, both paraprocts extensively sclerotized. Known only from Haiti and southern Dominican Republic.

Glyphembia haitiana (Ross)

new combination

(FIGURE 16)

Mesembia haitiana Ross, 1940b:646, figs. 17–19; 1944:440; 1984b:23.—Mariño and Márquez, 1984:91.

Holotype.—Male, on slide, USNM. Data.—Haiti: Grosmorre 17-II-26 (C. H. Leonard).

Data interpretation.—It is assumed that the type locality is Gros-Morne located in the northwest corner of Haiti.

Discussion.—This species is very closely related to a new species I collected in arid habitats of southwestern Dominican Republic. Differences between the two species will be discussed following the description of the new species. This comparison was aided by availability of the holotype of *G. haitiana* (on loan).

Glyphembia dominicana Ross

new species

(FIGURE 17)

Holotype.—Male, on slide, CAS. Data.—Dominican Republic: 13 km S of Azua, 83 m elev.,

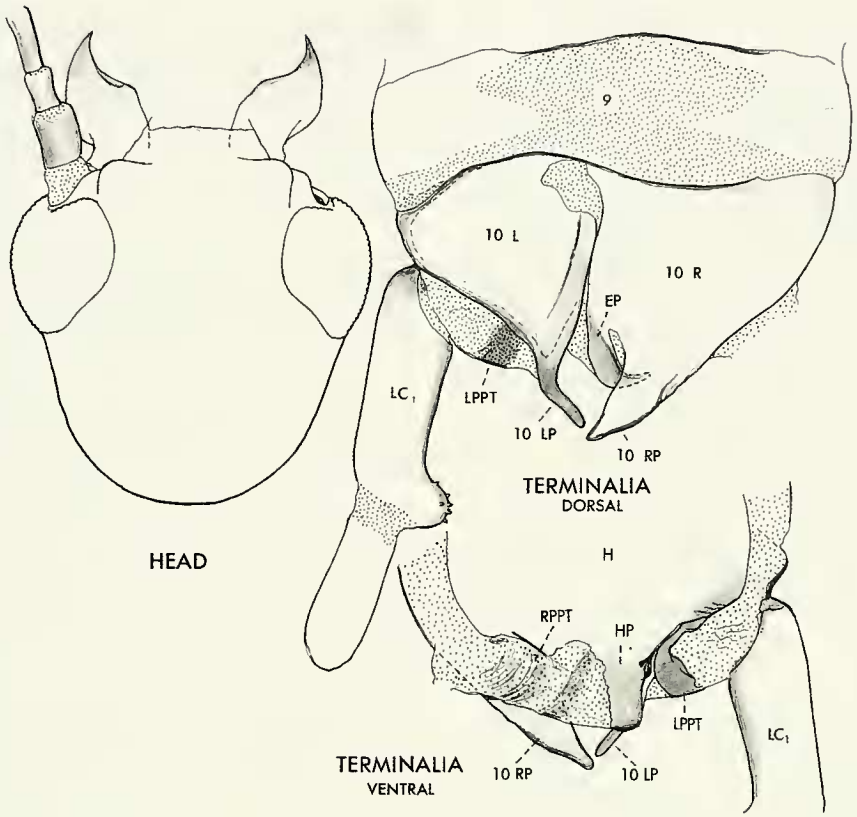

FIGURE 16. *Glyphembia haitiana* (Ross), holotype. Type locality: Haiti: Grosmorre (Gros-Morne?).

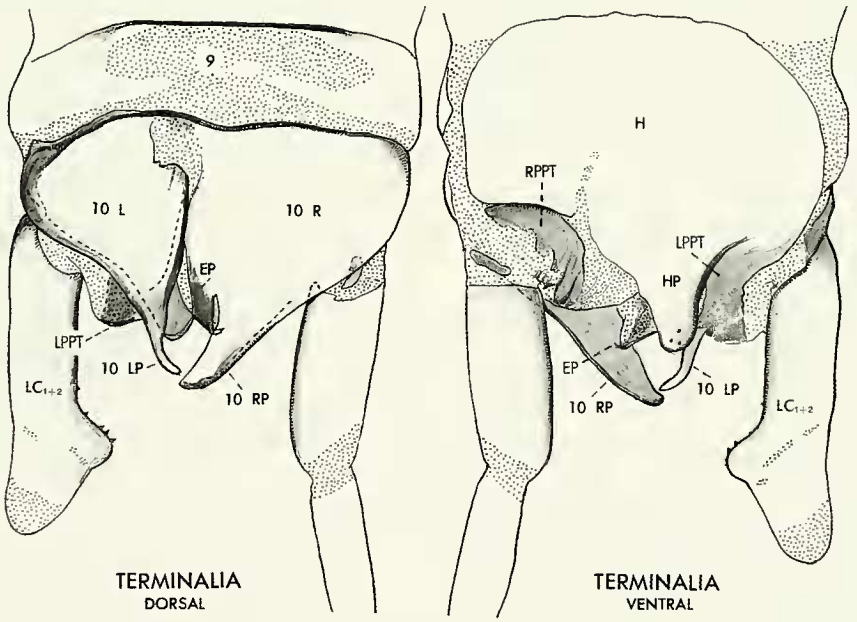

FIGURE 17. *Glyphembia dominicana* Ross, new species, holotype. Type locality: Dominican Republic: 13 km S Azua, Azua.

Prov. Azua, matured in culture 10-IX-87 (E. S. Ross).

Description.—Appearance: Very small, alate; uniformly brownish black, except for white cervical membranes and those between pro- and mesothorax, thus forming a white intersomital band; antennae largely yellowish. Color details (in alcohol): Cranium uniformly dark chocolate brown without pattern. Basal two antennal segments brown, 3–8 clear yellow but becoming darker distad, 9–17 grading from tan to light brown (complete). Mouthparts brown except mandibular apices grading to dark amber. All body sclerites and legs dark brown, all portions of terminalia somewhat darker. Wings medium brown with narrow, sharply defined hyaline stripes; costa and RBS borders magenta, the latter slanting into costa before wing apex; RP + MA and RP medium brown, basal half of M_{2+3} light brown, longitudinal veins otherwise represented only by macrotrichia; cross-veins absent except for one or two RBS-RP.

Important integumental characters.—The broad, almost circular cranium; eyes small, lacking pigmented facet interstices, interspace three eye-widths wide. Terminalia as figured, noteworthy is the very slender 10 LP which is upturned and then curved mesad; HP narrow, somewhat bulbous, apical margin evenly rounded, well sclerotized, especially along left margin. Gonapophyses not visible. Left paraproct (LPPT) very large, narrow, elongate, fused at base to hypandrium (H). Right paraproct (RPPT) well sclerotized, margins irregular, arced around base of left cercus. Basal segment of left cercus (LC_1) long, tubular, evenly sclerotized; distal lobe small, sparsely echinulate; distal segment broadly fused to LC_1, apically weakly sclerotized. Dimensions (on slide): Body length 7.0 mm; forewing length 3.5 mm, breadth 1.0 mm.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Appearance: Varied shades of tan, abdomen darkest. Color details: Cranium golden with faint vertex pattern, eyes black. Antennae pale tan, 16-segmented. Prothorax pale tan, narrowly margined with rust brown; associated and cervical membranes pale tan, crests of folds rust brown. Meso- and metathorax mottled tan which is visible through transparent derm. All legs medium brown. Abdomen appearing darker due to mottled rust brown visible through transparent derm. Basal segments of cerci translucent creamy white, distal segments rust brown. Body length 7.5 mm.

Paratypes.—Series from type culture deposited in CAS, USNM, BMNH, and other major collections.

Other specimens.—Dominican Republic: series from 7 km W Duverge, Barahona, 10 m; Mela, east of Duverge, 50 m (1 male has a two-segmented left cercus, others one-segmented).

Biology.—All cultures were started from specimens collected in the arid southern portion of SW Dominican Republic. This area is believed to be a "fragment" of Mesoamerica which drifted from the southwest and "fused" with the main portion of Hispaniola. Portions of the contact are below sea level. I failed to find anisembiids in other regions of Dominican Republic—only several new species of the family Teratembiidae and Oligocene amber fossils.

At the type locality, near Azua, colonies were abundant in leaf litter accumulated in crotches of acacia trees and on the ground. Conditions were very dry. In the Duverge region, to the west, colonies were found in bark crevices of small trees in an apparently natural, remnant forest. In cultures adults matured during all months of the year.

Discussion.—As expected, *G. dominicana* is closely related to *G. haitiana* but differs as follows: It is very small, perhaps the smallest species of Anisembiidae, only about half the size of *G. haitiana*; apparently it is much darker in color, almost black (the holotype of *G. haitiana* is in poor condition and perhaps less melanic due to age); the eyes of *G. haitiana* are larger, separated by only two eye-widths instead of three; RBS of the wings of *G. haitiana* doesn't fuse apically with the costa, but does so strongly in *G. dominicana*; the terminalia of the two species are very similar, *G. haitiana* differing, however, in having a conspicuous, subcutical line paralleling the entire length of the inner margin of the left hemitergite.

VETEHAE GROUP

Szumik's Dominican Amber species, *Anisembia vetehae* is tentatively placed in *Glyphembia* but this would need to be based on whether or not there is a membranous area at the base of tenth tergite's cleft.

Also, the broadening of the inner side of 10 R, not labelled in her drawing, but labeled EP (epiproct sclerite) in my re-labelling of her figure, would be significant if the broadening is indeed EP (an important character of *Glyphembia*). I am assuming that, as in most amber fossils, these details aren't clear in the holotype.

A separate group is here suggested because of the species' dilated, striated, left tergal process and the partially fused distal segment of the left cercus.

Glyphembia vetehae (Szumik)

new combination

(FIGURE 18)

Anisembia vetehae Szumik, 1998:7, figs.

Holotype.—Alate male in Dominican Amber, AMNH.

Paratype.—Male in Dominican Amber, AMNH.

Discussion.—The paratype lacks terminalia and, because similar appearing anisembiids have been encountered in Dominican Amber, one cannot be certain that the specimen is conspecific to the holotype. According to my redefinition of the genus *Anisembia* (Ross, 1984b:27), *A. vetehae* shouldn't be placed in that genus because it lacks a prominent subapical flange on the left mandible and probably has other distinguishing characters, apparently not visible in its holotype. The shape and striation of 10 RP and that of 10 LP support the present assignment in *Glyphembia*. In such details there is a resemblance to *G. catemacoa* (Ross); however, this may be due to convergence. Fusion of the left cercus segments should be used with caution as a character defining species and genera. In *Glyphembia* two-segmented and one-segmented cerci may vary inter- and intraspecifically.

The other *Glyphembia, G. amberica* n. sp., from Dominican Amber, is clearly distinct from *G. vetehae* because of its very slender 10 LP, more elongate cerci and undoubtedly many other characters not visible in a shrivelled fossil. The dilated, rounded, spatuate 10 LP is the most distinctive character of *G. vetehae*.

Currently, Szumik publishes terminalia figures upside-down. To aid comparison with my figures, I republish her figure 4 modified to conform with illustrations produced by all other embiid specialists.

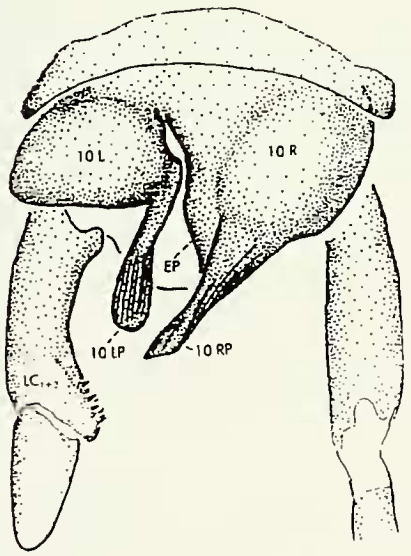

FIGURE 18. *Glyphembia vetehae* (Szumik), new combination, as figured by Szumik (1998:7 fig. 4) but inverted and relabeled by me to conform with other figures in this study. Type locality: Dominican Amber (Oligocene).

Genus *Bulbocerca* Ross

Anisembia (*Bulbocerca*) Ross, 1940b:654; 1944:448.

Bulbocerca Ross, 1984b:25.—Szumik, 1996:51 (in cladogram).

Type species.—*Anisembia sini* Chamberlin, 1923, by original designation.

Name basis.—Greek *bulbos* = swelling, in reference to the globose left cercus lobe.

Description.—Males: Size medium to small, body length averaging 9 mm; apterous or alate; coloration interspecifically variable from pale tan to black, or multicolored. Cranium often exceptionally large, elongate-oval. Eyes small, nymphoid. Antennae rather short, segments increasing in length distad, unicolorous. Mandibles large, elongate, outer sides extensively straight before apical curvature; inner-apical arcuation of left mandible with a subapical flange. Submentum broader than long. Thorax with or without slight development of wing pads; fully alate in some species or races; wings, when present, with costal and apical margins white, fork of M in apical third of wing. Hind basitarsi short,

globose, finely and densely setose. Tenth abdominal tergite not cleft to base, the short cleft arcuated toward left, its margins not elevated or sclerotic. Left hemitergite (10 L) sclerotic on basal and caudal margins only; left process (10 LP) short, apex curved to left; right process (10 RP) fairly prolonged, truncate or feebly tapered. Epiproct sclerite (EP) large, broader than long. Gonapophysis "rods" not developed. Ninth sternite (H) large, evenly but weakly sclerotized; its process (HP) very broad, extensive, irregularly truncate apically. Left paraproct (LPPT) broadly, weakly sclerotized in some species; right paraproct sclerite (RPPT) at times well represented; both may be convex. Basal segment of left cercus largely cylindrical with inner side flattened and sclerotic, then abruptly expanded as a bulbous, densely microechinulate nodule; apical segment short, rounded, broadly fused to basal segment. Basal segment of right cercus elongate, its apical segment rather short.

Females.—Without significant generic characters.

Discussion.—The discovery of three or more new species closely related to *B. sini* strengthens the generic status of *Bulbocerca*. The genus appears to be confined to the arid coastal zones of Sonora and the peninsula of Baja California (at least as far north as Laguna Chapala). Therefore, its occurrence is well separated from that of *Anisembia* and *Glyphembia* by the central Mexican plateau and Sierra Madre Occidental. Consistent differences in many anatomical characters provide a basis for generic separation from *Anisembia* and *Glyphembia* and other related genera. Alone, none of these characters is of generic importance, in aggregate they are conclusive.

Distribution.—*Bulbocerca* colonies usually occur under and between stones especially in the thin shade of desert trees and shrubs growing along arroyos. Using deep subterranean galleries, the embiids endure some of the greatest aridity and heat found in North America. In addition to rocky habitats, one species found in a sandy zone, utilized dry cattle droppings as cover and food. Probably only one generation develops per year.

Component species.—Besides the type species, *B. sini* (Chamberlin), holotype CAS, from Loreto, Baja California, and San Carlos Bay, Sonora, Mexico, several new species are in my collection (CAS). Three are from the peninsula of Baja California, one is from a northern island in the Gulf of California, and another from Kino Bay on the mainland of Sonora. Most species are distinguished by size and coloration. When this portion of Mexico is thoroughly searched, one may expect many more species and races will be discovered. Speciation may have been stimulated by male apterism and population size reduction during periodic drought. Alate species were collected under stones at the edge of usually dry Laguna Chapala, a rather elevated locality in north-central Baja California, at Napolo in a canyon draining into the Gulf of California opposite Isla Santa Catalina, and in the peninsula's Cape Region.

Collecting cultures, as in arid regions of Australia and elsewhere, depends on being in a locality which has had recent rainfall. It is possible that the entire length of Baja California south of Sierra San Pedro Martir and the coastal deserts of Sonora are populated by species and races of *Bulbocerca*.

KEY TO SPECIES OF *BULBOCERCA*

(Males)

1. Head and body entirely pale amber; apterous. Occurs in east-central Baja ..... *fulva*
— Head and body multipigmented or uniformly blackish. Apterous or alate 2
2. Head and body entirely blackish; apterous or alate. Ranging from north-central Baja to Cape San Lucas ..... *nigra*
— Head and body brown or multicolored; apterous or alate 3
3. Apterous, robust; head brilliant golden yellow, body blackish. East-central Baja and San Carlos Bay, Sonora ..... *sini*
— Alate, slender, small; head and body uniformly brown, membranes creamy white Laguna Chapala, north-central Baja ..... *minuta*

Bulbocerca sini (Chamberlin)

(Frontispiece)

Anisembia sini Chamberlin, 1923:346.

Anisembia (*Bulbocerca*) *sini* (Chamberlin), Ross, 1940b:654; 1944:448.

Bulbocerca sini (Chamberlin) Ross, 1984b:25.

Holotype.—Apterous male on slide, CAS. Data. —Mexico: Baja California: Loreto (J. C. Chamberlin).

Discussion.—*Bulbocerca sini* males are readily recognized by their contrasting golden yellow head and dark brown body. Remarkably, *B. sini* also occurs on the east side of the Gulf of California in rocky hills NW of San Carlos Bay. If it wasn't spread by humans, its occurrence would be older than the Gulf, but this is unlikely in view of the great similarity of males in the two regions. Perhaps, however, there could have been landbridge connections in certain places during global sea level lowering during Pleistocene glacial periods. In both populations colonies occur under leaf litter between rocks.

Description.—Appearance: Adult males are multicolored. Their cranium is golden yellow, gradually clouded subcutaneously with pale brown toward clypeus. Basal two antennal segments yellow amber, other segments medium brown to apex (23 segments, complete). Body sclerites, except pale brown acrotergites, glossy piceous with faint bluish luster; tiny rudimentary wing pads are white. Cervical sclerites and posternum 1 and caudal corners of prosternum amber. All other body membranes very dark lavender (almost concolorous with sclerites) except pro-mesothoracic membranes which are creamy white, forming a band. All legs varied shades of brown except hind coxae and trochanters which are pale amber. Terminalia dark chestnut brown, cerci medium brown speckled with tan, apices of cerci yellow white.

My topotypes (CAS) were collected in shaded leaf litter of a stony ravine at the road junction leading to Loreto, located a short distance east. This habitat has since been destroyed by human development. It will be interesting to determine the full range of *B. sini* on both sides of the Gulf.

A small immature male I collected far to the north of San Carlos Bay under a stone in barren desert near Kino Bay, Sonora, matured 15-I-61. Except for smaller size (body length one-fourth shorter), minor coloration and anatomical distinctions, and overall paler coloration, this male apparently is related to *B. sini*, as suggested by its golden yellow cranium.

Bulbocerca nigra Ross

new species

(FIGURE 19)

Holotype.—Male, on slide, CAS. Data.—Mexico: near Triunfo, Cape Region, Baja California. Matured in culture 30-XII-99 (W. Savary).

Description.—Appearance: Alate, entirely black except for a narrow white band between pro- and mesothorax and dark purple membranous areas; all sclerotic surfaces have a faint, metallic blue sheen. Color details in alcohol: Cranium entirely black, lacking pattern; surface dull, finely alutaceous with a faint bluish luster. Eyes and preclypeal membranes dark pink. Mouthparts and antennae entirely black, 18-segmented (complete). Body and legs black with bluish sheen; acrotergite 1 black, membrane between pro- and mesothorax pure white, all other intersclerotal membranes dark purple. Wing bands smoke black, costal margin and borders of RBS white. Tenth abdominal tergite and processes glossy black with blue luster; cerci black with purple membranes. Dimensions (on slide): Body length 10.5 mm; forewing length 4.9 mm, breadth 1.1 mm.

Important anatomical characters.—As figured. Cranium exceptionally globose. Wings rather short, not extended to apex of abdomen; MA + RP forks distad of mid-wing.

Paratypes.—Seven topotypic males deposited in CAS and UNAM. Matured in type culture II-00.

Allotype.—Female, in alcohol, CAS. Data. — From type culture.

Description.—Cranium chestnut brown, prothorax and legs mahogany brown, terga paler medially. Membranes between pro- and mesothorax white, forming a conspicuous pale band; acrotergite 1 tan. Paragenital sterna and cerci dark brown. Body length 12.0 mm.

Additional records.—A cultured series from Rancho La Fortuna, 15 mi E San Jose del Cabo, 2 m elev. (E. S. Ross), most matured during IV-89. One female, same locality 2-III-87 (D. Ubick). A cultured series from Nopolo, a small fishing village about 20 km S of Loreto. Colonies under stones at edge of wash. During II-71 eggs and nearly mature nymphs were present. Adults matured later in February. Wings shorter than type series. A cultured series from 12 mi SE Vizcaino junction (at road to Bahia de Los Angeles), near Punta Prieta, 39 m elev. (E. S. Ross). Rocky hills with dense mesquite and saguaro; recent rain, colonies under stones. One apterous male, 2 mi SW San Angel, Vizcaino Desert, under dry cow dung on sand dune, matured in culture I-VII-61 (A. Smith).

Discussion.—The extensive range of this species in Baja California is surprising, especially be-

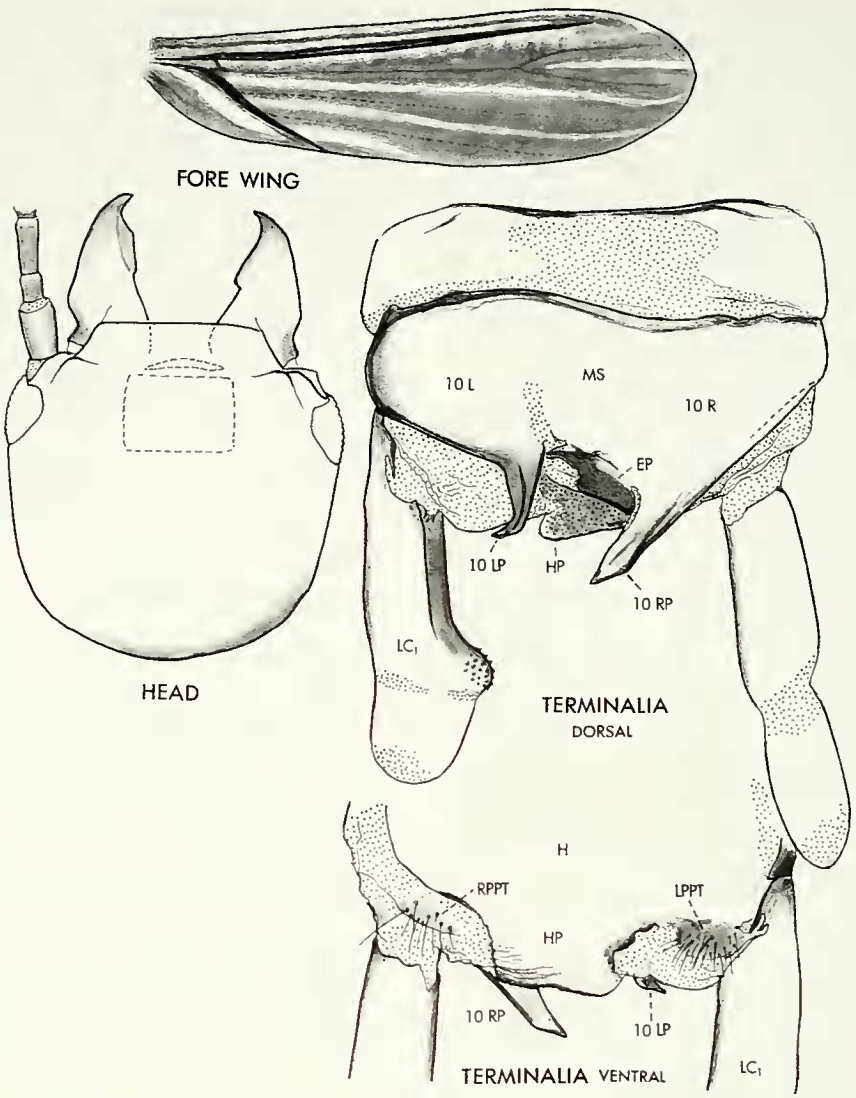

FIGURE 19. *Bulbocerca nigra* Ross, new species, holotype. Type locality: Mexico: near Triunfo, Cape Region, Baja California.

cause distinct congeners occur in intermediate localities, such as Napolo which is only about 20 km S of Loreto, the type locality of *B. sini*. As is to be expected, there are slight distinctions within and between these populations, but these shouldn't justify naming subspecies. In addition to its brilliant golden yellow or orange head and mouthparts, *B. sini* males differ in having an exceptionally broad submentum with arcuate sides and large, globose paraproct sclerites. The presence of wings in some populations of *B. sini* shouldn't be surprising.

Bulbocerca fulva Ross

(FIGURE 20)

Bulbocerca fulva Ross, 1984b:26.

Holotype.—Male, on slide, CAS. Data.—Mexico: Baja California, Comondu 21-VII-38 (E. S. Ross).

Description.—Appearance: Adult males golden amber throughout, including legs. Cranium and pronotum darker, golden brown. Sclerites of thorax and abdomen mottled subcutaneously with rust brown. Terminalia concolorous with body, processes translucent. Body membranes concolorous with

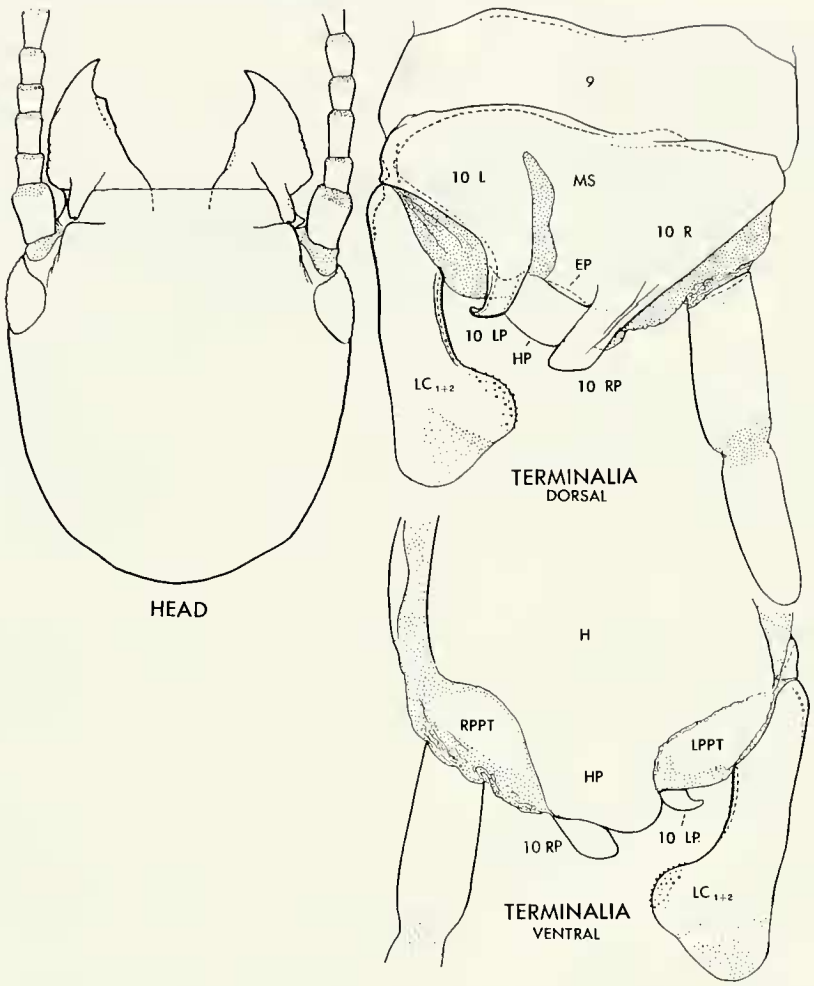

FIGURE 20. *Bulbocerca fulva* Ross, holotype. Type locality: Mexico: Comondu, Baja California.

sclerites. Acrotergites pale amber, adjacent membranes dark creamy white, therefore a pale pro- and mesothoracic band isn't formed. Body length 8.5 mm.

Discussion.—This uniformly pale species appears to be confined to canyons and washes flowing eastward out of the Sierra Giganta of central Baja. In addition to topotypes, I collected specimens in leaf litter between stones at the edge of a wash near Canipole, just south of Bahia Concepción.

Bulbocerca minuta Ross

new species

Holotype.—Male, on slide, CAS. Data.—Baja California: 8 mi N Laguna Chapala, Districto Norte. Matured in culture VIII-X-65 (E. S. Ross).

Description.—Appearance: Smallest species of the genus, winged; generally chestnut brown, membranes creamy white, terminalia dark brown. Color details (in alcohol): Cranium uniformly chestnut brown, clypeal margin amber, eyes blackish. Antennal segments 1 and 2 amber, others blending from medium brown to tan apically, 19-segmented (complete). All legs and body sclerites chestnut brown except terminalia and cerci which are dark mahogany brown; all intersclerotal membranes creamy white. Wings with costal margin and borders of RBS white.

Integumental characters.—Cranium elongate-oval. Tenth tergal processes tapered to sharp points. Dimensions (on slide): Body length 8.5 mm; forewing length 3.75 mm, breadth 1.0 mm.

Paratypes.—Numerous adult males from type culture deposited in CAS, USNM, and UNAM.

Allotype.—Female, in alcohol, CAS. Data.—Reared in type culture.

Description.—Appearance: Pale tan, head darker. Color details: Cranium uniformly chestnut

brown; body form narrow, elongate. Antennae pale tan, darker distad. Legs and all dorsal body sclerites pale tan, abdominal terga slightly darker caudad; all intersclerotal membranes and cerci creamy white; entire venter of body creamy white. Body length 11.0 mm.

Parallotypes.—Females from type culture, deposited in CAS, USNM and UNAM.

Discussion.—This species is readily distinguished by its small size, coloration and northerly occurrence. Galleries were encountered on undersurfaces of small stones on a desert flat. Activity was apparently stimulated by a rare southern extension of Pacific coast spring rains. Adults matured in my culture during June and July and as late as September and October.

TRIBE EXOCHOSEMBIINI

Genus *Exochosembia* Ross

new genus

Type species.—*Exochosembia cavagnaroi* Ross, new species, by present designation.

Name basis.—Greek *exochos* = projecting in reference to projected clypeus.

Distribution.—Mesoamerica: Guatemala, Honduras, El Salvador.

Description.—Males: Similar in appearance to those of *Saussurembia*. Cranium well sclerotized, very broad across eyes, sides strongly caudally-convergent; anterior margin of clypeus sclerotic, angles conspicuously projected forward as large, acute lobes. Antennae 17-segmented, yellowish except for dark basal two segments; apices not white. Eyes small with facet interstices pigmented. Mandibles very large, bases very broad; apices strongly produced, parallel-sided, inner-apical arcuation short. Prothorax usually contrastingly pale yellow with dark pleural stripes. Wings with RBS merging with C well before wing apex; RP + MA and RP sclerotized, veins otherwise represented only by setae; cross-veins marked by large blotches of white; wing apices broadly white. Hind basitarsi elongate; plantar setae dense, slender, regular in form and length. Tenth abdominal tergite not cleft to base nor with longitudinal sclerotization, as in *Saussurembia*. Left tergal process (10 LP) very broad basally, diagonally strigose; inner side broadly arcuated toward left and continued to apex as a slender, faintly-visible process; outer side blending to membrane; apex lacking a setal tuft. Right process (10 RP) prominent, gradually tapered; apex asymmetrically acute. Epiproct sclerite (EP) very long, represented by a narrow, dark sclerite closely appressed to the diagonal inner side of right hemitergite. Hypandrium process (HP) slanted toward left, membranous on right apical angle; surface convex and transversely strigose. Left paraproct (LPPT) narrow, fused basally to side of HP, extensively produced caudally and curved dorsad above inner side of left cercus. Right paraproct (RPPT) short, irregular but well sclerotized. Left cercus with outer basal flange extensive, inner side sclerotic and rugose, inner apex produced as a narrowly-rounded, echinulate lobe which is angled basad; basal segment of right cercus cylindrical, basal rim simple, circular; apical segments short, concolorous with basals.

Females.—Glossy piceous except for the following pale yellow areas: antennae beyond segment 2, prothorax except for red-brown pleural stripes, dorsal membranes and sclerites between meso- and metathorax, and forecoxae. Without significant generic structural characters.

Discussion. — Unless intermediates are discovered, species of *Exochosembia* will be readily distinguished by their large, complex mandibles, lobed clypeus, peculiar wing pigmentation and unusual male terminalia characters.

Component species. — Two additional new species; one from El Salvador, the other from Honduras.

Species usually occur in leaf litter of oak forests 5000 to 6000 ft. elevation. One male specimen occurring in a shipment of orchid plants from San Jose, Guatemala was intercepted in United States plant quarantine. One series was collected in crevices of palm trunks in a garden in El Salvador.

Exochosembia cavagnaroi Ross

new species

(FIGURE 21)

Holotype.—Male, on slide, CAS. Data.—Guatemala: near Panajachel, Lago Atitlán, 5000–6000 ft. elev., matured in culture 29-I-64 (D. Cavagnaro).

Name basis.—Named after David Cavagnaro who, during participation in my 1961–62, eighteen-month Indo-Australian expedition, became a skilled embiid collector and applied that expertise during his later travels.

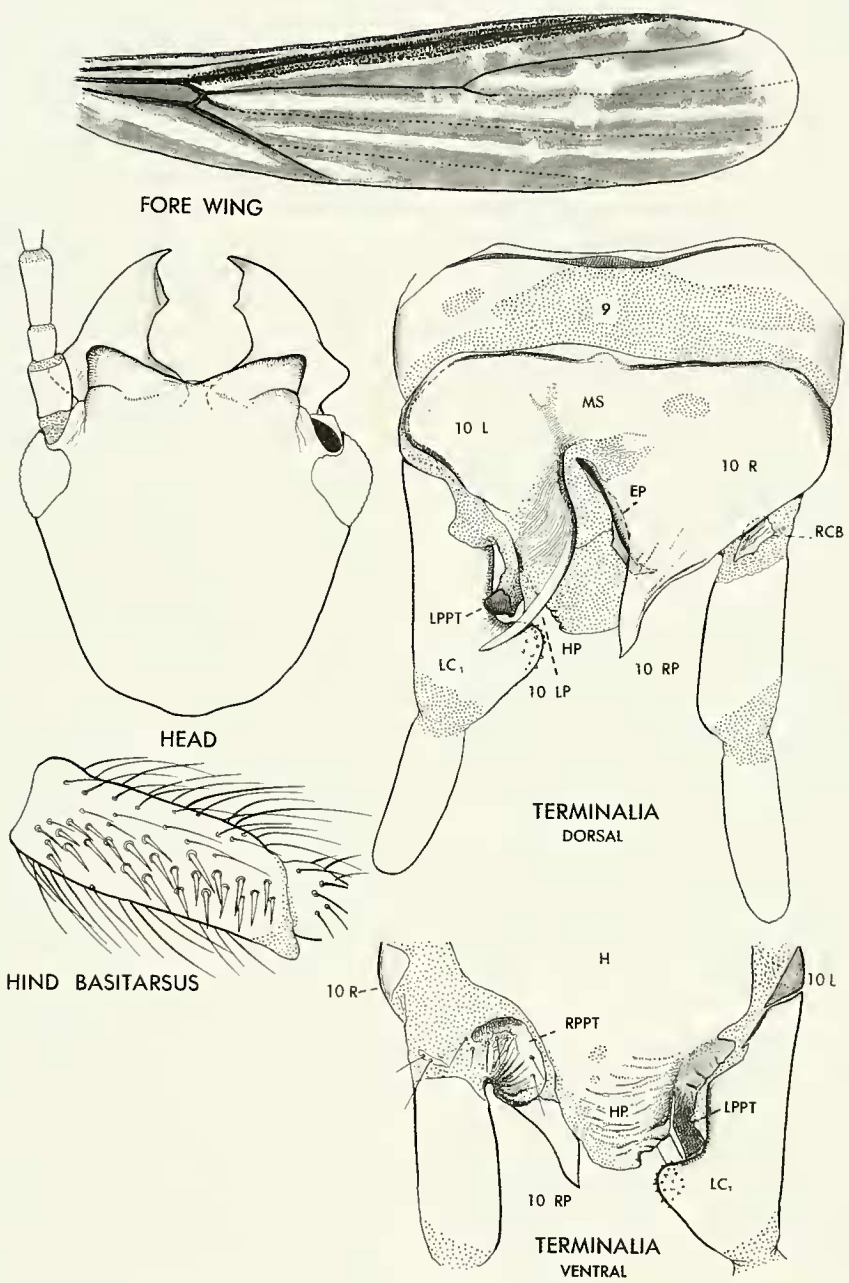

FIGURE 21. *Exochosembia cavagnaroi* Ross, new species, holotype. Type locality: Guatemala: near Panajachel, Lago Atitlán.

Description.—Males of this species may be recognized by reference to the described and figured generic characters. A detailed description will be presented when the other species in my collection are described. Body length 7.74 mm; forewing length 4.25 mm, breadth 1.0 mm.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Small, blackish brown with yellowish prothorax. Color details: Cranium small, dark chestnut brown, mottled with dark

brown; mouthparts and basal two antennal segments brown, other antennal segments yellow with pink apical membranes. Prothorax transparent, pale yellow, with rust brown pleural stripes which also extend along sides of cervix; forecoxae and trochanters pale yellow, other foreleg segments dark brown. Posterior pronotal plate golden brown; surrounding membranes pale, mottled with brown. Mesonotum and its pleurites piceous brown with greenish gold luster. Mid-coxae and trochanters golden yellow, margined with reddish brown; midlegs otherwise dark brown except for largely yellow-brown tibial bases and tarsi. Sclerites and membranes between meso- and metanota transparent creamy white; metathoracic sclerites and legs concolorous with respective portions of mesothorax. Abdominal sclerites uniformly dark brown with greenish gold luster; surrounding sclerites uniformly dark brown with greenish gold luster; surrounding membranes whitish; cerci almost black, including joint membranes, except for smokey brown terminal cercus apices. Body length 11.5 mm.

Paratypes and parallotypes —Many topotypic adults deposited in CAS, INBO, USNM and BMNH. Paratypes also include series with the following data: Guatemala: San Lucas Tolimán, Lago Atitlán, 5200 ft. (E. S. Ross) CAS; Guatemala: Above Santa Catarino Palopó, Lago Atitlán, 5000 ft. (E. S. Ross) CAS.

Additional record: Guatemala: Chinautla (near Guatemala City) (E. S. Ross) CAS. Collected in leaf litter of oak woodland. Although slightly distinct from the Lago Atitlán series, this series appear to be conspecific.

Discussion.—*Exochosembia cavagnaroi* is closely related to a new species from Volcán S. Salvador, Lago Coatepeque, and Cerro Verde, El Salvador. These specimens have less pronounced lobing of the clypeus of adult males. Another new species, named below, from Honduras is more distinct, males being unicolorous brown and with even less lobing of the clypeal angles.

Exochosembia unicolor Ross
new species

Holotype.—Male, on slide, CAS. Data.—Honduras: 22 mi SE Siguatepeque, 2800 ft. elev. matured in culture 22-I-78 (E. S. Ross).

Description.—Appearance: Small, slender, alate; jet, glossy black throughout except for whitish caudal area of pronotum, gray prosternum, white ventral prothoracic and cervical membranes and white apical margins of wings; all other membranous areas dark purple. Color details (in alcohol, freshly killed): Cranium uniformly jet black, finely alutaceous, glossy. Eyes dark purple with black facet interstices. Antennae entirely black to blackish brown with reddish membranes; 15-segmented (complete). Mouthparts blackish brown except for dark amber mandibular apices and dark purple labral and anteclypeal membranes. Pronotum dark brown blending to gray-brown caudad and white in mediocaudal membrane; prosternum gray, adjacent membranes pure white; cervical sclerites blackish. Remainder of sclerotic surfaces of body and all legs glossy black with metallic blue luster; weakly sclerotized areas and all membranes dark purple; cerci largely dark purple, blackish in sclerotic areas. Wing bands smoke black; hyaline stripes narrow, evenly margined; only two white cross-veins on forewing, none on hind wing; radius and costal margin brick red, closely approximated; apices of all wings white; no large white blotches on cross-veins. Dimensions (on slide): Body length 6.5 mm; forewing length 4.0 mm; breadth 1.0 mm.

Important anatomical characters.—Cranium similar to that of *E. cavagnaroi*, differing as follows: left mandible with an obtuse subapical flange; molar cusps on both mandibles large, acutely pointed. Clypeal margin much less projected. Left tergal process, including talon short; epiproct sclerite broad, not heavily sclerotized or narrowly fused to inner edge of 10 R.

Allotype.—Female (CAS) from holotype culture.

Description.—Appearance: Glossy, dark, mahogany brown except for extensively creamy white prothorax, a lesser band between meso- and metathorax, largely yellow antennae and forecoxae. Color details (in alcohol): Cranium very dark, glossy, mahogany brown, lacking pattern; basal 2 antennal segments dark brown, 3–9 pale yellow, 10–12 pale tan (incomplete segments). Prothorax and associated membranes lemon yellow except for cervical membranes tinged with dark purple, forming a pleural stripe; acrotergite 1 translucent pale yellow. All other body sclerites varied shades of mahogany brown, those between meso- and metascuta paler; all sclerotic surfaces glossy. Legs mahogany brown except for pale yellow forecoxae and trochanters. Apex of abdomen, cerci, and associated membranous areas

darker mahogany brown; extreme tips of cerci golden tan. Body length 8.0 mm.

Paratypes —A series from type culture deposited in CAS, INBIO, and USNM.

Genus *Pogonembia* Ross

new genus

Type species.—*Pogonembia motaquae* Ross, new species, by present designation.

Name basis.—Greek *pogon* = beard, in reference to unique hair tuft on inner apical margin of left tergal process.

Distribution.—Northern Guatemala: Rio Motaqua drainage; Mexico: Puebla.

Description.—Males: Medium sized, rather robust, alate or apterous; generally blackish with a contrasting white, membranous, cervical band behind head and another between pro- and mesothorax. Antennae unicolorous brown. Entire costal wing margin narrowly white, wing apex more extensively white; white cross-veins absent. Cranium oval, sclerotic; surface microreticulate; anterior clypeal angles normal, not projected as in *Exochosembia*; mandibles large, elongate; molar area broad, evenly arcuate, not abruptly angled 90° as in *Exochosembia*; incisor portion short; left mandible with a submedial flange (absent on right mandible); both mandibles lacking apical dentation. Wings, when present, rather short; RBS angles toward costal margin and joins it before apical curvature; two cross-veins between RBS and RP, cross-veins absent elsewhere in wings except for one between Cu_{1a} and A. Tenth tergite not cleft to base. Left process (10 LP) very broad; inner side broadly arcuate, but not ridged; outer side weaker, becoming membranous at apical angle; apex of process rounded, bearing a dense clump of large setae with prominent sockets. Right hemitergite (10 R) large, triangulate; inner side margined with a narrow sclerotic "rod," which is the fused medial flap sclerite (MF); right process (10 RP) angled inward and apically truncate, inner side curved. Ninth sternite (H) with a submedial, submembranous area; process (HP) tapered, weakly-defined; but with weakly sclerotized gonapophysis structures within. Left paraproct (LPPT) fused basally to side of H, extended caudad as an at-first-narrow and then broadened sclerite which is apically truncate and upturned. Right paraproct (RPPT) a weak, fragmented ring around inner base of right cercus. Left cercus (LC_{1+2}) one-segmented, short; the fused apical segment conical, submembranous, the line of fusion apparent as fragmented, narrow membranous lines; lobe of basal segment small, conical, directed meso-dorsad, coarsely echinulate. Right cercus normal. Females dark mahogany brown with paler cranium and pale bands between thoracic nota and femorotibial joints. Without noteworthy generic anatomical characters.

Discussion.—*Pogonembia* is closely related to *Exochosembia* Ross, but differs strongly in many characters, such as the absence of massive projections of the clypeal margin, the broader left tergal process (10 LP) with an apical setal tuft, and the short, one-segmented left cercus. The habitat of *Pogonembia* is lower in altitude in a semi-arid, cactus-thorn bush zone, whereas species of *Exochosembia* appear to be confined to pine-oak zones of higher mountains and volcanos at altitudes ranging from 800 ft. to at least 7000 ft.

Additional record.—A series cultured from stock collected at Rio Hondo, Prov. Zacapa, lower down in the Rio Motagua valley at 800 ft elev., appears to be conspecific with the type series. However, all males are apterous, but it is likely that alate individuals would occur in a more extensive sampling of additional populations.

Biology.—Both populations were collected in thorn-bush thickets in colonies located in splintered stumps left by wood cutters. During the field-encounter period, September 4–5, 1976, half grown nymphs were present in the colonies. These matured during November and early December.

Pogonembia motaguae Ross

new species

(FIGURE 22)

Holotype.—Male, on slide, CAS. Data.—Guatemala: 5 mi NW of El Progreso, Prov. El Progresso, Rio Motagua valley, 1850 ft. elev., matured in culture 8-XI-1976 (E. S. Ross).

Description.—Appearance: Rather small, robust, alate; generally blackish with white membranes before and behind pronotum forming two bands; costal margin of wing and its apex white. Color details (in alcohol): Cranium dorsally blackish brown, finely alutaceous, luster dull, lacking pattern; clypeus becoming dark chestnut brown; venter becoming pale golden brown, then dark directly behind submentum.

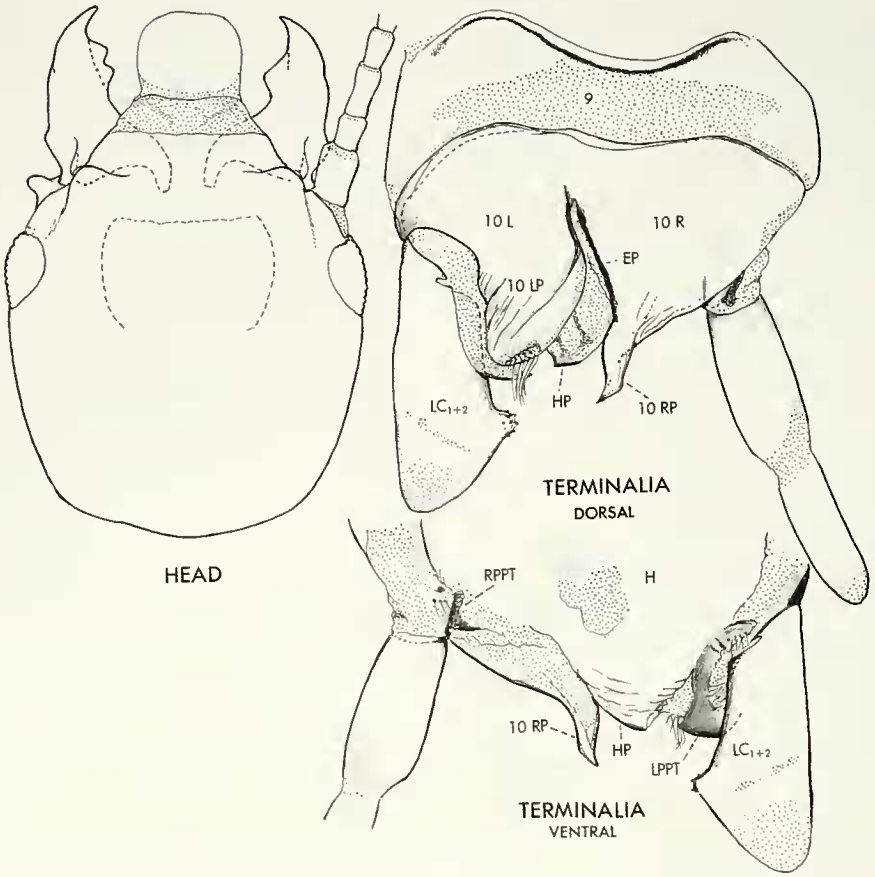

FIGURE 22. *Pogonembia motaguae* Ross, new species, important characters of an apterous male from Rio Hondo, Zacapa. Type locality: Guatemala: Rio Motagua valley, near El Progresso.

Eyes small, reddish brown. Basal antennal segment chestnut brown, 2 less reddish, 3 yellow-gray, 4–17 (complete number) dark brown with rust red membranes. Clypeolabral membranes pink-white; labrum chestnut brown; mandibles largely translucent amber; palpi dark brown, other sclerites of mouthparts golden except submentum which is dark chestnut brown. Cervical membranes white, sclerites dark brown. Sclerotic portions of thorax and legs various shades of dark brown; surface alutaceous, dull dorsally with faint greenish luster; membranes between pro- and mesothorax white, thoracic membranes otherwise subcutaneously rust red. Wings dark brown with narrow, white, hyaline stripes; entire costal margin narrowly white, wing apex white, cross-veins not marked with white as in *Exochosembia*. Abdominal sclerites dark brown, with metallic green luster; membranous areas subcutaneously rust red; terminalia similar in color but with apices of processes becoming dark amber; cerci largely dark reddish brown, apices of terminal segments paler. Dimensions (on slide): Body length 7.5 mm; forewing length 4.1 mm, breadth 1.0 mm.

Important anatomical characters.—The oval cranium with clypeus normal; eyes small, nymphoid. Mandibles broad basally, elongate, complex, form as figured. Submentum large, broad; lateral margins inflexed; anterior margin transverse, not inflexed. Terminalia characters as figured.

Allotype.—Female, in alcohol, with holotype data and disposition.

Description.—Appearance: Rather small; reddish, mahogany brown except for a pale band between each thoracic somite, especially behind the pronotum. Color details (in alcohol): Cranium basically dark amber, but symmetrically clouded with mahogany brown; venter paler. Eyes blackish. Basal antennal segment translucent yellow, tinged with rust brown; segments 2–4 clear, pale yellow; others to apex (18) increasingly medium brown. Labrum golden brown medio-basally; mandibles amber with piceous dentation; other mouthparts shades of medium brown. Cervical sclerites dark amber, membranes creamy white. Thoracic sclerites and legs dark, clouded mahogany brown except for whitish

femorotibial joints. Anterior margins and caudal angles of pronotum, with white fat clumps visible through derm; also, due to similar fat clumps, a whitish intersegmental band is present between pro- and mesonotum, as well as between meso- and metanotum. Abdomen concolorous with thorax but darker caudad; membranes dark purple and not contrasting with sclerites; eighth sternite transversely wrinkled, submembranous medially with dark brown lateral angles; ninth sternite completely dark brown; cerci including membranes, uniformly dark mahogany brown. Body length 8.0 mm. Without noteworthy anatomical characters.

Paratypes.—Thirteen adult males and one female reared in type culture. Deposited in CAS, INBIO, USNM, and BMNH.

Biology.—The type series is the brood of a single female which occupied a splintered sapling base in dense, shrub-like second growth on a steep, eroded hillside. The original vegetation must have been arid-tropical mountain forest with scattered saguaro-like cacti. Adult males appeared in the culture during October through December, 1976; June through November, 1977; and three during April 1978.

Pogonembia neovenosa (Mariño)
new combination

Mesembia neovenosa Mariño, 1994:234, figs. 1–4.

Holotype.—Male (UNAM). Data.—Mexico: Puebla, Calipan, 1050 m elev., 18-III-93 (Ernesto Barrera).

Discussion.—As indicated in Mariño's figure 1, *P. neovenosa* has a broadly obtuse subapical flange on the left mandible. In *P. motaguae* the flange is emarginated. In both species the wing's apical margin is white, however, in *P. neovenosa* the forward edge of the wing is broadly white, in *P. motaguae* this area is narrowly white. The terminalia of the two species are quite similar, however, in *P. neovenosa* 10 LP appears to be narrowly tapered (unless the submembranous left side was overlooked by Mariño) and the inner-apical margin has longer, more numerous setae. The right process, 10 RP, appears to be much broader in *P. neovenosa*. These characters strongly support my conclusion that *P. neovenosa* shouldn't be assigned to *Mesembia* or to *Glyphembia*.

Habitat.—The type series was collected in the bromeliad *Tillandsia recurvata* in low, deciduous forest.

POINAREMBIINI Ross
new tribe

Type genus.—*Poinarembia* Ross, new genus, by present designation.

Distribution.—Hispaniola: Dominican Amber.

Description.—Males: Alate, having general appearance of many other species of Anisembiidae, but having several unique terminalia characters, especially the form of the composite left cercus — the lobe of the left cercus being especially large and bearing a single row of large echinulations on a single plane on its arcuate inner edge. Females: Unknown.

Genus *Poinarembia* Ross
new genus

Type species.—*Poinarembia rota* Ross, new species, by present designation.

Distribution.—Dominican Amber.

Name basis.—Named after George O. Poinar, Jr., in recognition of his extensive interest in arthropods fossilized in amber, who secured three specimens of the type species of this genus. The specific name, *rota*, refers to the cogwheel-like arrangement of echinulations on the left cercus lobe (*rota* in Latin = wheel).

Description.—Males superficially similar to species of the genus *Glyphembia* Ross, two species of which also have been found in Dominican Amber; however, *Poinarembia* is smaller, more robust, and has shorter wings. Males are distinctive in having the lobe of the left cercus greatly prolonged mesad at 90° with its inner apex bearing a single row of large echinulations on a single plane. The base of the lobe is slightly constricted, thus causing the terminal portion to be almost circular in profile. In the holotype specimen the lobe is slightly projected dorsad and angled basad. The distal cercus segment, almost completely "absorbed" into the basal, is represented only by a cluster of setae. Due to fossilization, details of the basal area of the tenth tergite cannot be seen, however, there is a minute lobe projecting mesad on the inner, medial margin of 10 R; this may be the medial flap (MF). A small, narrow sclerite projected just caudad of MF? may be the epiproct's sclerite (EP). In the subfamily Anisembiinae, EP usually is aligned with the inner margin of 10 R, or it is a broad, transverse sclerite. The tergal processes 10 LP and 10 RP are broad-based and acutely tapered caudad. Due to the shriv-

elled condition of its venter, details of the paraprocts and hypandrium lobe cannot be seen.

Poinarembia rota Ross
new species
(FIGURES 23, 24)

Holotype.—Male to be deposited in CAS. Data. — Dominican Amber, Oligocene? (George O. Poinar, Jr. collection).

Description.—Appearance: Very small, (body length 4.5 mm), winged; uniformly dark brown. Cranium dark brown with rather small eyes separated by two and one-half eye widths. Antennae apparently uniformly light brown, 18-segmented (complete). Body stout. Wings relatively short with typical anisembiine venation; RP well sclerotized, other veins weak, represented only by rows of setae; three RBS-RP cross-veins, none elsewhere on wings; RP + MA forked at mid-length of wing; hyaline stripes very broad, pigment bands very close to veins. Abdomen as broad as pterothorax, terminalia as broad as abdomen; significant features of terminalia are figured. Females: Unknown.

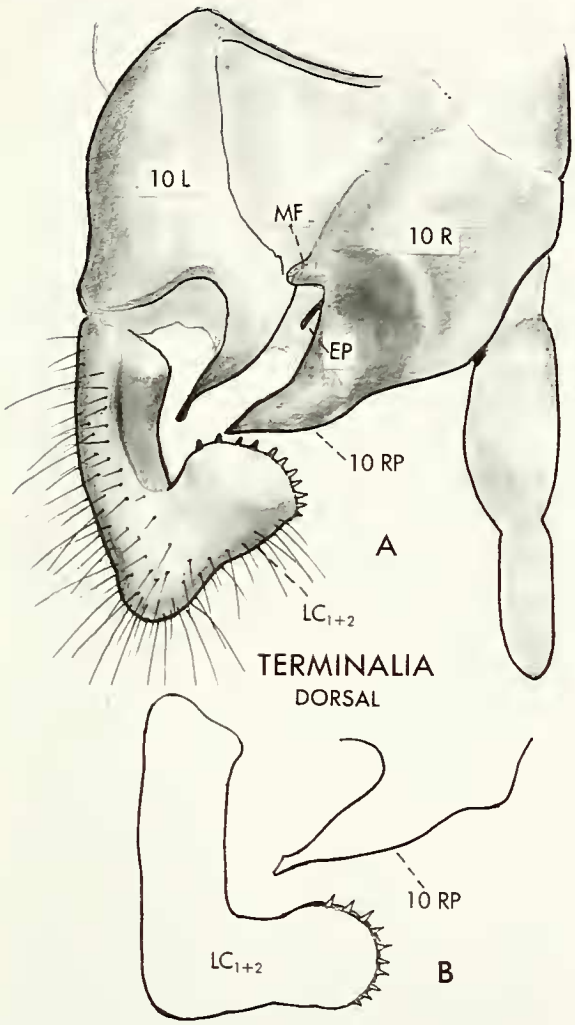

FIGURE 23. *Poinarembia rota* Ross, new species. A. Terminalia of holotype, and B. Left cercus and right process of a paratype. Type locality: Dominican Republic: fossil in Oligocene amber.

Paratypes.—Two males with holotype data. It will be important to retain these in one collection due to their variable condition and positions in the amber. All are badly twisted and shrivelled. Future fine polishing of the amber may more clearly reveal characters and it may be desirable to "grind-out" one of the wings to gain a better view of the terminalia.

Scolembiinae Ross
new subfamily

Type genus.—*Scolembia* Ross, new genus, by present designation.

Distribution.—Bolivia: Yungas zone, Santa Cruz region.

Description.—Males large (body length averaging 12 mm), alate, vestiture exceptionally long. Cranium relatively small, elongate. Mandibles short; apices simple, non-dentate; inner arc of left mandible with a low, broadly arcuated flange. Submentum small, weakly sclerotized. Wings with narrow hyaline stripes; all veins except Cu_{1a}; well sclerotized cross-veins conspicuous, between most veins; these are white in one species when crossing a hyaline stripe. Tenth abdominal tergite not cleft to base; basal portion of cleft membranous, with weak, irregular margins. Left tergal process (10 LP) small, sclerotic, abruptly formed, simple, narrow, curved leftward. Right hemitergite (10 R) large, triangulate; process (10 RP) gradually twisted and tapered as it slants mesad, apex a sharp sclerotic hook. Epiproct (EP) a broad sclerite, continuously fused to inner side of 10 R, less strongly so cephalad. Hypandrium (H) well defined, gradually narrowed leftward to form a broad, trough-like process (HP) which is curved leftward and turned upward between the tergal processes. Ejaculatory duct apex with twisted sclerotization, gonapophysis "rods" absent. Left paraproct (LPPT) sclerite narrow, fused to H basally, arcing dorsad around inner base of left cercus. Right paraproct obsolete. Basal segment of left cercus with

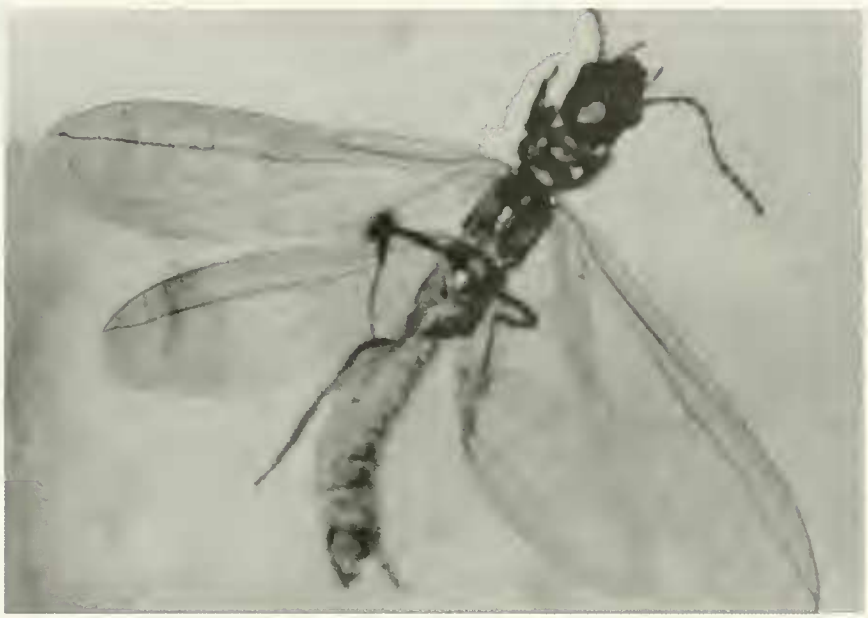

FIGURE 24. *Poinarembia rota* Ross, new species, holotype. Type locality: Dominican Republic: fossil in amber (Poinar photo). This photo appeared in Poinar, 1992:109, misidentified by Ross as a species of *Mesembia* Ross.

an abrupt, thumb-like, echinulate inner lobe which slightly angles basad; basal rim irregular. Basal segment of right cercus cylindrical, evenly sclerotized; basal rim weak, circular, adjacent basal membrane with several small sclerites. Apical segments of cerci large, elongate. Females without apparent subfamily characters.

Discussion.—To date only one genus is known.

Genus *Scolembia* Ross

new genus

Type species.—*Scolembia celata* Ross, new species, by present designation.

Name basis.—Greek *skolos* = pointed object, thorn, in reference to the thorn-like form of tergal processes.

Distribution.—Bolivian yungas.

Description.—Males: Large, body length averaging 12 mm; alate; darkly pigmented with head and prothorax often paler; certain leg, antennal, and cercus segments at times white; body surface dull, vestiture exceptionally long. Head relatively small, weakly sclerotized, elongate, sides straight, abruptly rounded caudally; eyes small; antennae very long, 23-segmented, all segments dark except apical three which are white. Mandibles small, pale, outer margins continuously arcuate; inner-apical arc of left mandible with a broad, arcuated, low flange. Mentum large; submentum small, weak, as long as broad, sides arcuate. Wings dark with narrow, distinctly margined, hyaline stripes; all veins well sclerotized except Cu_{1a} which is reduced to a row of setae; crossveins, present between all veins except on either side of Cu_{1a}, are marked with white in one species when crossing a hyaline stripe. Hind basitarsi large, elongate, plantar setae dense. Tenth abdominal tergite not cleft to base, basal portion of cleft with weakly margined, irregular membranous areas. Left process (10 LP) abruptly narrowed, parallel-sided, evenly curved laterad at apex. Outer side of right hemitergite (10 R) slanted mesad, straight, continuous with side of process (10 RP) which is narrowly acute and slightly bent ventro-mesad. Epiproct sclerite (EP) very large, almost completely fused to inner side of right hemitergite. Ninth sternite (H) broader than long, longer on left side, sides arcuate; process (HP) elongate, surface convex and transversely strigose, strongly slanted leftward and upward; extreme apex membranous and densely micro-strigose. Aperture of ejaculatory duct (ED) at times complex. Left paraproct sclerite (LPPT) a slender sclerotic arc extensively fused at base to side of HP and closely aligned with inner base of left cercus. Right paraproct (RPPT) subobsolete. Right cercus-basipodite (RCB) represented by a few sclerotic fragments. Basal segment of left cercus well sclerotized with an abruptly-

formed, acute or thumb-like, sparsely-echinulate lobe, slightly angled basad on mid-mesal side. Basal segment of right cercus cylindrical, evenly sclerotized. Apical segments similar, elongate, white in one species, not in the other.

Females.—Large, body length averaging 15 mm; generally dark brown with contrasting white areas, as follows: Antennal apices, basal membranes of fore-coxae, anterior margin of posterior pronotal plate, membranes between meso- and metathorax, mid- and hind coxae and dorso-pleural membranes of abdomen. Cranium rather elongate, surface dull; microreticulate; with a golden, transverse "cloud" between eyes. Eighth abdominal sternite arched, sides and caudal margin forming a continuous arc; darkly pigmented at sides. Second valvifers ridged, darkly pigmented. Ninth sternite almost completely sclerotized with a shiny, non-setose, medial plate, slightly longitudinally-carinate medially. Both paraprocts caudally depressed. Apical segments of cerci tapered to a sharp point.

Discussion.—*Scolembia* is a very distinct genus whose large size and more complete wing venation suggests that it is plesiomorphic. However, its abdominal terminalia appear to be highly apomorphic. In many respects the terminalia show anatomical and functional convergence with some Indian oligotomoid genera, but not a relationship.

Biology.—To date two species have been collected. I found *S. celata* colonies in sheltered leaf litter at the bases of trees and under the edges of logs and fallen branches resting on matted leaves. The silk galleries were gray-white, elastic, and radiated between layers of leaves which served as food. The movement of the embiids was sluggish and they often feigned death by immobility. *Scolembia celata* is highly gregarious and tolerates close crowding. It is probable that a leaf litter habitat can be occupied only in forests, such as those near Santa Cruz, Bolivia, which experience prolonged dry periods. In most other tropical forests ground-level habitats are intolerably damp at all times.

At least two generations may develop annually. Males matured in my cultures during August and their offspring matured during January to March the following year.

Component species.—My collection contains two undescribed species, both from Bolivia's Santa Cruz region. Such localized speciation suggests that the genus may comprise many more species.

The two may be distinguished as follows: the wings of *S. celata* males have white cross-veins, those of *S. penai* without white cross-veins; the left cercus lobe of *S. celata* is shorter and broad-based, this lobe is longer and narrower in *S. penae*; and in *S. celata* both left cercus segments are brown, the apical segment is white in *S. penai*.

Scolembia celata Ross

new species

(FIGURE 25)

Holotype.—Male, on slide, CAS. Data.—Bolivia: Montero, Dept. Santa Cruz, matured in culture C–776, 7-IX-64 (E. S. Ross).

Name basis.—Latin *celatus* = concealed or hidden, in reference to the hidden colonies.

Description.—Appearance: Large, slender; varied shades of golden tan, cranium golden yellow with tan setae and mottling, eyes blackish, antennae medium brown except for 4 white apical segments; legs medium brown except for creamy white mid- and hind coxae, cerci entirely brown. Color details (in alcohol): Cranium basically golden yellow, densely mottled with brown; a pale, transverse amber streak present between clypeus and frons. Eyes black. Antennae long; segments 1–24 chocolate brown, grading to tan distad; segments 25–28 abruptly white (complete). Body and legs varied shades of brown and tan, membranes pale purple. Wings brown with narrow, well-defined hyaline stripes; "granular" border lines of RBS purple; cross-veins white when crossing a stripe.

Important anatomical characters.—As figured. Most significant is the broad-based LC_1 lobe. Dimensions (on slide): Body length 11.5 mm; forewing length 7.0 mm, breadth 2.0 mm.

Allotype.—Female, in alcohol with holotype data and disposition.

Description. — Appearance: Large (body length 11.5 mm), mostly mahogany brown with white antennal apices, a creamy white band between each thoracic somite, pale mid- and hind coxae, and whitish abdominal pleura forming longitudinal stripes. Color details (in alcohol): Cranium mahogany brown lacking vertex pattern but having a conspicuous, transverse, golden "cloud" between eyes. Antennal segments 1–22 medium brown, 23–27 abruptly white (complete). Most thoracic pleural membranes are dark lavender brown except those

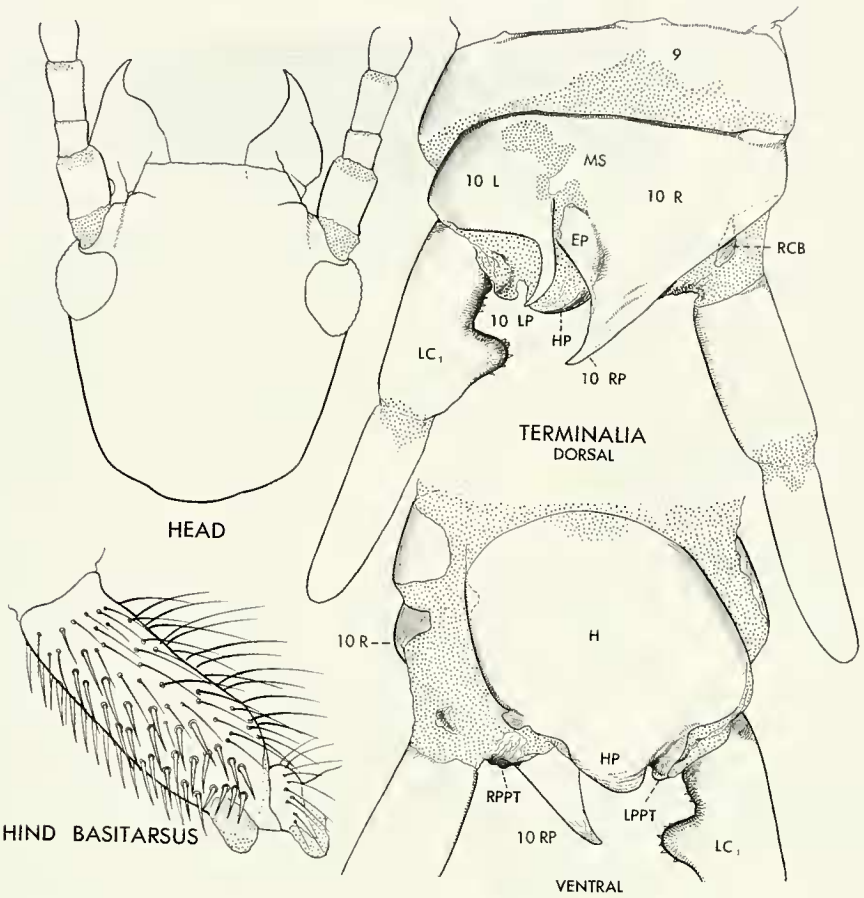

FIGURE 25. *Scolembia celata* Ross, new species, holotype. Type locality: Bolivia: Montero, Dept. Santa Cruz.

surrounding the dark brown acrotergite 1 and those between meso- and metanotum, thus appearing as a conspicuous pale band. Mid- and hind coxae creamy white, legs otherwise mahogany brown. Abdomen, including cerci, varied shades of mahogany brown except for pleural creamy white membranes.

Paratypes and parallotypes.—Hundreds of adults reared in the holotype's culture (C–776) deposited in CAS, USNM, and other major collections.

Additional record.—Bolivia: Angostura, 70 km SW Santa Cruz (C–771), matured between May and November, 1965, mostly during November (E. S. Ross). This large series has the same general characters as holotype. However, adult males generally are paler, especially the prothorax which is contrastingly creamy white. The cranium is distinct in its pronounced vertex pattern. Females are darker than the topotypes and pale, interocular "cloud" is much smaller.

Biology.—As described for the genus. In cultures adults matured during all months. The species thrives in cultures.

Scolembia penai Ross

new species

(FIGURE 26)

Holotype.—Male, on slide, CAS. Data.—Bolivia: Buena Vista, Prov. Ichila, Dept. Santa Cruz (W. E. Peña).

Name basis —Named for the late W. E. Peña of Chile who made extensive collections of insects and assisted other entomologists in their fieldwork.

Description.—Appearance: Large, winged; blackish with apical antennal segments and those of cerci white. Color details (in alcohol): Wings and body blackish brown except as follows: Antennal segments beyond 20th contrastingly pale, 21st me-

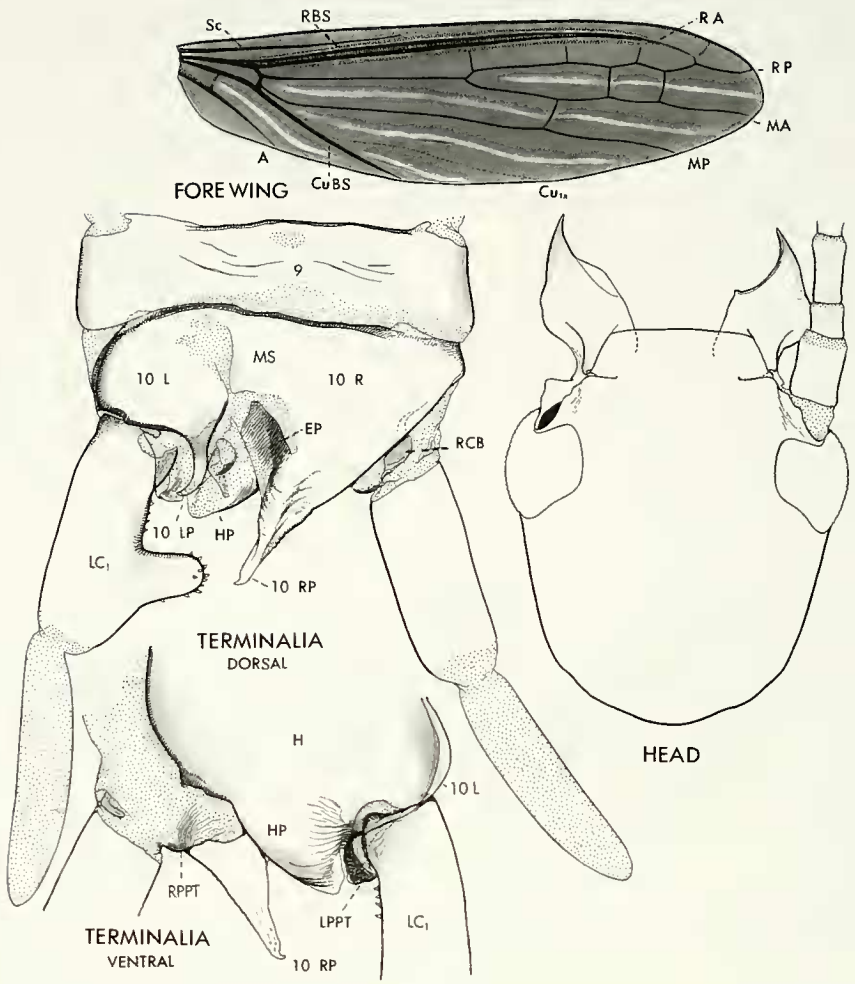

FIGURE 26. *Scolembia penai* Ross, new species, holotype. Type locality: Bolivia: Buena Vista, Prov. Ichila, Dept. Santa Cruz.

dium brown, 22–24 creamy white, terminal segments lost but undoubtedly white; coxae and trochanters yellow-brown with a darker surface tinge, these segments not strongly contrasting with other leg segments. Wings dark with well-defined, narrow hyaline stripes; without white cross-veins. Dimensions (on slide): Body length 14.0 mm; forewing length 8.5 mm, breadth 2.2 mm.

Important anatomical characters.—As figured. Most diagnostic is the abruptly-formed, long, thumb-like LC_1 lobe; that of *S. celata* is broad-based, shorter and conical. Process of right hemitergite (10 RP) is more strigose, apically extended with a distinct terminal hook.

Paratypes.—None.

Allotype.—Adult female in alcohol from same lot as the holotype (CAS).

Description.—Similar to females of *S. celata*, differing as follows: color generally darker, interocular "cloud" much smaller; lateral pleural stripes of abdomen less conspicuous and, most significant, as in the male, the apical segments of the cerci are contrastingly white instead of brown. Body length 12.0 mm.

Aporembiinae Ross
new subfamily

Type genus.—*Aporembia* Ross, new genus, by present designation.

Distribution.—Colombia: Upper Magdalena Valley.

Description.—Males: Small (body length 5.5 mm), alate; uniformly brown except for paler antennae and white cerci. Cranium oval with clypeal margin normal; eyes large, coarsely-faceted; antennal segments elongate, setae normal. Mandibles short; acutely, apically tapered and sharply pointed; without trace of apical dentation or subapical flange on left mandible. Submentum quadrate, flat, weakly sclerotized, margins not inflexed. Wings with RBS paralleling costa, not merging with it at apex; MA unbranched; hyaline stripes narrow. Hind basitarsus elongate, with only one papilla; plantar setae elongate, especially basad. Terminalia with tenth tergite very broadly cleft. Left hemitergite (10 L) equilaerally triangulate; left and basal margins well sclerotized, inner margin very weak, blending to membrane. Process (10 LP) heavily sclerotized; simple, narrow, parallel-sided, curved ventrad and terminated as a blunt point; surface longitudinally microstrigose. Inner-basal margin of right hemitergite (10 R) very weak, irregular, blending to membrane; outer margin weak but definite, its slant continuous with that of its apical process (10 RP) which is short, acutely pointed and sclerotic. Medial flap (MF?) a transverse, densely and finely microspiculate area with a translucent fold. Epiproct sclerite (EP) lying on same plane as 10 RP, arising from a sclerotic basal arc adjacent to MF?, thence broadening caudad on a well-developed epiproct flap. Hypandrium (H) quadrate, weakly sclerotized, especially medio-basally; its process (HP) very short, well centered, transversely wrinkled and more sclerotic medially. Left and right paraprocts (LPPT and RPPT) almost equally developed, but with very distinct, large sclerites; the left somewhat transverse and fused to HP, the right larger, elongate, almost parallel to body axis. Basal segment of left cercus cylindrical; its inner lobe distal, densely echinulate on its inner-basal slope; basal margin of segment well sclerotized; apical segment normal. Right cercus with basal margin circular, unsclerotized. Females: Unknown.

Discussion.—As implied by its name, the phylogenetic position of Aporembiinae is uncertain. The non-dentate mandibles of the male, the oligotomoid venation and the hind basitarsi indicate a placement in the Anisembiidae. However, the terminalia are quite similar to those of the Andesembiidae. For the present, however, the subfamily is assigned to Anisembiidae because the symmetry and form of the paraprocts closely resemble the condition in the Anisembiine genus *Isosembia* Ross, whereas in most andesembiids the right paraproct partially encircles the inner base of the right cercus in the manner of a cercus-basipodite.

To date only one genus and species is known. It was collected in leaf litter and humus during an ecological survey of forest types in Colombia's Magdalena Valley.

Genus *Aporembia* Ross

new genus

Type species.—*Aporembia sturmi* Ross, new species, by present designation.

Name basis.—Greek *aporema* = doubt, perplexity, in reference to questionable relationship of the genus. The species is named after the collector, Dr. Helmut Sturm of Germany who kindly gave me the type specimens.

Distribution.—Colombia: Upper Magdalena Valley.

Diagnosis.—In the absence of any related genus, *Aporembia* may be distinguished on the basis of the subfamilial characters cited above.

Aporembia sturmi Ross

new species

(FIGURE 27)

Holotype.—Male, on slide, CAS. Data.—Colombia: Carare-Opón, 29-VII through 4-VIII-1968, Forest type III litter and humus, 150 m elev. (H. Sturm).

Description.—Appearance: Small, alate; head and body chestnut brown, antennae and legs pale tan, cerci pure white. Color details (in alcohol): Cranium chestnut brown, mottled with rust brown. Eyes lavender black. Mouthparts and antennae pale tan. Prothorax chestnut brown, margined with dark rust brown, crests of cervical and prothoracic membrane folds also dark rust brown. Pterothorax chestnut brown, paler than prothorax due to reduced rust brown mottling. Legs pale tan except for darker basitarsus. Abdomen pale brown, mottled with rust brown; cerci entirely white due to color of internal tissue. Dimensions (on slide): Body length 5.5 mm; forewing length 3.5 mm, breadth 0.9 mm.

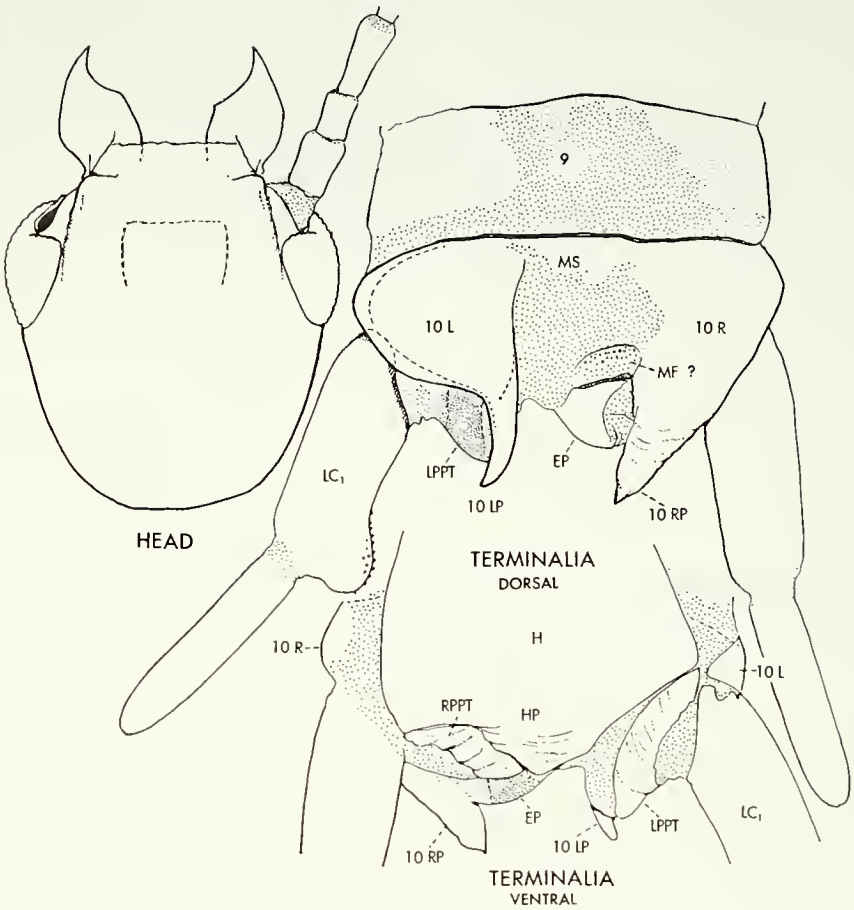

FIGURE 27. *Aporembia sturmi* Ross, new species, holotype. Type locality: Colombia: Carare-Opón, upper Magdalena Valley.

Important anatomical characters.—As described and illustrated for the subfamily.

Paratype.—One male, on slide, with holotype data (CAS).

Chorisembiinae Ross
new subfamily

Type genus.—*Chorisembia* Ross, new genus, by present designation.

Distribution.—Trinidad; probably also occurs in mountains of northeastern South America.

Description.—Adult males small (body length 5.5 mm), alate; pale tan with darker head. Mandible apices non-dentate, acutely pointed; left mandible without a subapical flange. Submentum sclerotic, shield-like, with all margins inflexed; anterior angles produced. Wings with RBS paralleling C, its apex arced into RP; base of MA and all of RP sclerotized; apex of MA (beyond fork) and all of MP and Cu_{1a} not sclerotized, represented only by setae; crossveins absent except for an indistinct one between RBS and RP. Hind basitarsis very slender, elongate, without a second papilla. Terminalia weakly sclerotized; tenth tergal cleft very broad to base, its margins indistinct. Left hemitergite (10 L) deeply excised by membrane almost to its left margin; its process (10 LP) sclerotic, simple, angled mesad and then ventrad; terminated as a narrow, sharp point. Right hemitergite (10 R) broad, separated from cleft by a fine sclerotic line; setae absent across inner basal third (MS); process (10 RP) abruptly narrowed and curved ventrad, its indistinct apex recurved toward base of segment. Epiproct (EP) a thumb-like lobe projected caudo-mesad from beneath inner margin of 10 R. Margins of hypandrium (H) indistinct; left paraproct indistinct, apparently fused with HP; right

paraproct obsolete. Left cercus two-segmented; basal segment inwardly lobed toward apex, the lobe coarsely echinulated on inner-basal surface; basal rim sclerotic, irregular in outline. Basal segment of right cercus with base weak; circular, except for a slight ventral projection. Females: Unknown.

Discussion.—Placement of this subfamily in Anisembiidae is uncertain. Certain aspects of the terminalia suggest a relationship with andesembiids but there are many distinctions, especially in the peculiar, twisted processes and an undeveloped right cercus-basipodite. The type species is the only anisembiid with a sclerotic, shield-like submentum. Hopefully, additional species will be discovered which will clarify placement of the subfamily.

Genus *Chorisembia* Ross
new genus

Type species.—*Chorisembia howdeni* Ross, new species, by present designation.

Name basis.—Greek *choris* = apart, in reference to the unique characters setting the genus apart from all others.

Distribution.—Trinidad: one record from Morne Blue, 2780 ft. elev.

Description.—In the absence of any other related genus, *Chorisembia* may be distinguished on the basis of the above described subfamily characters.

Chorisembia howdeni Ross
new species
(FIGURE 28)

Holotype.—Male, on slide, CAS. Data.—Trinidad: Morne Blue, 2780 ft. elev., 6-VIII-1969 (H. and A. Howden).

Description.—Appearance: Small, alate, generally pale tan with dark brown head. Color details (in alcohol): Cranium dark brown blending to light brown caudad with a faint vertex pattern, surface shining; gular surface light brown. Eyes lavender black. Antennae medium brown, segment 2 yellowish; only six segments present, segments 3–6 exceptionally long. Mouthparts various shades of light brown. Thoracic sclerites basically yellow-tan with dark brown sutural lines; prothorax somewhat darker due to medium brown sclerites and brown-tinged membranes; pterothoracic membranes creamy white; legs unicolorous, concolorous with pterothorax; wings tan; abdomen weakly sclerotized, basically pale tan but with darkened brownish, subcuticular mottling; terminalia sclerites yellow-tan, hypandrium paler; cercus segments pale, membranous. Dimensions (on slide): Body length 5.5 mm; forewing length 4.2 mm; breadth 1.0 mm.

Important anatomical characters —As indicated in the subfamily diagnosis and figured. Females: Unknown.

Discussion.—According to the collector, for whom this species is named, the holotype was collected in a malaise trap set across a freshly fallen tree on a small path leading between the upper and lower telecommunication stations on the mountain crest known as Morne Blue. I am indebted to the collector for permitting deposition of the holotype in CAS.

Platyembiinae Ross
new subfamily

Type genus.—*Platyembia* Ross, new genus, by present designation.

Distribution.—South America: Upper Amazon Basin.

Description.—Males and females with body and legs flattened, almost depressed. Males with head short, circular; eyes large; mandibles short, very acutely pointed, non-dentate, left mandible without a subapical flange. Submentum small, weakly sclerotized, especially the anterior margin; mentum rather large, transverse. Wings with hyaline stripes very narrow; RBS slanted forward toward wing apex (merging with it in hind wing); MA unsclerotized just distad of divergence from RP, MP and Cu not sclerotized. Terminalia highly transverse; tenth tergite broadly and increasingly cleft to basal margin; tergal processes short, truncate, strongly curved ventrad. Epiproct sclerite obsolete, perhaps fused beneath inner side of 10 R. Medial flap (MF) of 10 R apparently represented by two very sharp, prominent, sclerotic, basally-arced "claws." Hypandrium weak except for its evenly-arcuated process (HP) which has a sclerotized rim. Gonapophyses of segment IX prominent, with two widely separated arms projecting inward. Paraprocts obscure. Cercus segments exceptionally long, narrow; the distals as long as basals and narrowly tapered toward apices; lobe of left cercus abruptly arising midway on inner side, its apex echinulated. Females with a characteristic maculated dorsal pattern.

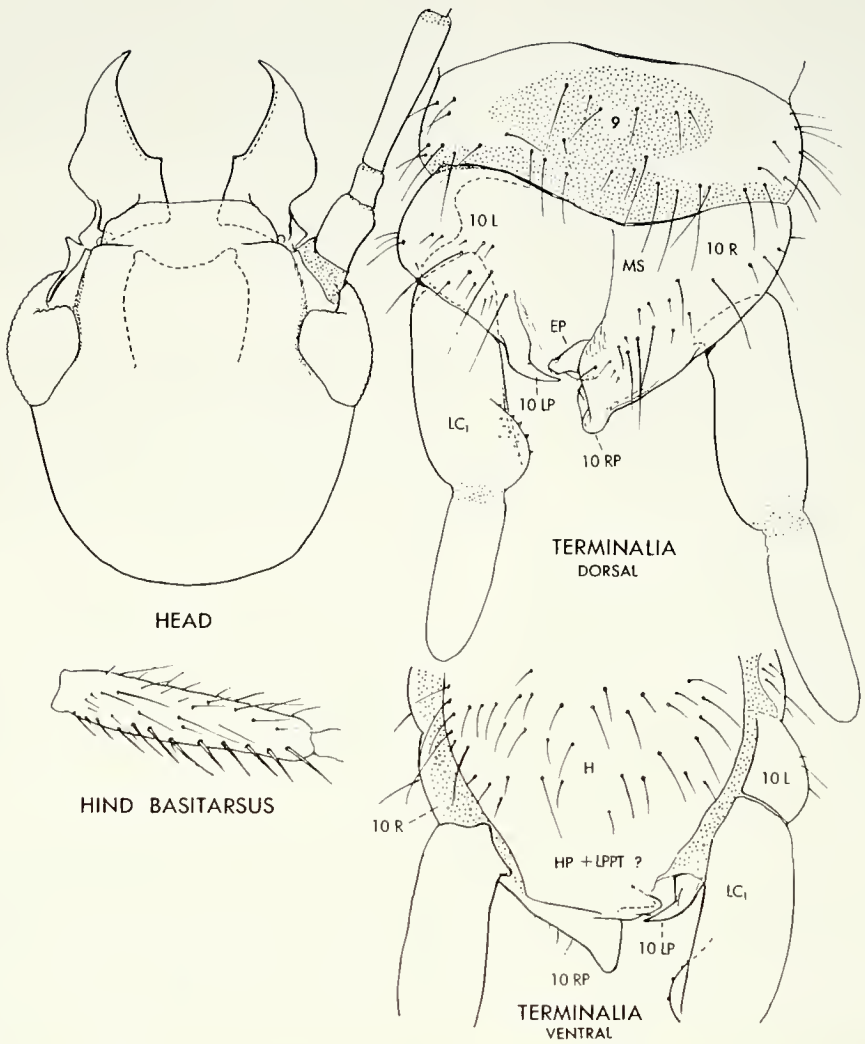

FIGURE 28. *Chorisembia howdeni* Ross, new species, holotype. Type locality: Trinidad: Morne Blue.

Discussion.—This taxon is clearly assignable to the Anisembiidae. In some features it is highly apomorphic, but the greatly elongate cerci are plesiomorphic and strongly resemble the form found in primitive genera, such as *Clothoda* and *Archembia*. At present only one genus is known.

Genus *Platyembia* Ross

new genus

Type species.—*Platyembia tessellata* Ross, new species, by present designation.

Name basis.—Greek *platy* = broad, flat, in reference to the flat body of females and nymphs.

Distribution.—South America: Upper Amazon Basin.

Description.—Males: Rather small, averaging 8 mm in length; alate; body unusually flattened. Head, antennae, and wings dark brown, body and legs pale; eyes large; antennae apparently uniformly brown; mandibles with narrowly acute apices exceptionally long, lacking inner-apical flanges; submentum longer than broad, weakly sclerotized. Wings normal, darkly pigmented; hyaline stripes very narrow, sharply defined; RBS converging apically toward costa; veins MA, MP, Cu, and A represented only by rows of setae; cross-veins absent behind RBS. Legs disproportionately large, foretarsi especially so. Tenth abdominal tergite broadly cleft to basal margin. Left hemitergite very small, inner margin very weakly defined; left process (10 LP) angled mesad, sides sub-parallel and carinate, curved latero-ven-

trad and terminated in a broadly acute apex. Right hemitergite (10 R) very large, inner margin broadly obtuse with two large, sharp, sclerotic, talon-like processes (MF) arising medially and arced forward; posterior margins of 10 R caudally convergent then briefly divergent to form a wide, truncate process (10 RP). Epiproct not recognizable. Paraprocts not sclerotized. Ninth sternite (H) almost unsclerotized; its lobe (HP) short, broadly, smoothly rounded. Gonapophyses "rods" wide-spaced, rather prominent. Cerci two-segmented, segments exceptionally long and slender; basal segment of left cercus abruptly, acutely lobed medially, lobe micro echinulate.

Females.— Short, broad, strongly flattened; head dark brown, otherwise basically yellow tan with brown maculation, especially on lateral borders of thoracic and abdominal terga; apical antennal segments abruptly dark brown. Body surfaces greatly flattened, even somewhat depressed. Legs, especially fore-basitarsi and hind femora, exceptionally large. Genital sternites not distinctive. Cerci exceptionally long, setae of inner side of basal segments very large. Body length 10.0 mm.

Discussion.—This genus is very distinct, not only in male characters, but also in those of the female and its unusual biology. The very broad tenth tergal cleft, the peculiar claw-like structures of the right hemitergite, and the very long cerci, are among the many characters found in no other anisembiids. The unusually long cerci and the shape and position of the echinulate lobe resemble the condition found in the plesiomorphic genus *Archembia* Ross. Females (Fig. 30) and nymphs have exceptionally flat or depressed body form.

Biology.—I first collected this species during 1954 at Yurac Plantation, west of Pucallpa, Peru. The galleries were spun beneath fully exposed silk sheets spun on the bark surface of small trees in a semi-cleared garden area. Beneath the silk sheet cover there were definite galleries separated by partitions of fecal pellets. The embiids were highly gregarious and notable for unusually swift movement. During November and December the developing broods mostly were penultimate females; only rarely was a developing male found. Unfortunately, these died before maturing and attempts to develop cultures failed; thus it was not until Dyrce Lacombe collected mature males associated with females similar to those encountered at Yurac that an identification was possible. Her specimens were found in a remote locality in northwestern Brazil. It should be noted that the Yurac population was heavily parasitized by sclerogibbid wasps.

During 1981 I encountered numerous colonies of *Platyembia* at the edge of virgin forest at Explorer's Inn on Rio Tambopata, about 35 km SW of Puerto Maldonado. As at Yurac, each colony comprised a single female and her brood. These were covered by a sheet of dense, clear, white silk on a tree trunk. Numerous very active nymphs were present in a labyrinth of smaller galleries. In their midst, fecal pellets were concentrated in low mounds densely covered with silk. Usually in twos and threes, eggs were scattered amongst the fecal pellets.

In spite of great geographic distances, all of my samples, in spite of minor distinctions, appear to represent a single species. One male has three medial flap claws instead of two.

Platyembia tessellata Ross
new species
(FIGURES 29, 30)

Holotype.—Male, on slide, CAS. Data.—Peru: Explorer's Inn, Rio Tambopata, Madre de Dios, 290 m elev. Matured in culture 5-XII-82 (E. S. Ross).

Name basis.—Latin *tessellatus* = mosaic pattern, in reference to maculation of females.

Description.—Appearance: Medium sized, winged, body flattened; body and legs pale tan with dark brown mottling; head, antennae, and wings contrastingly dark brown. Color details (in alcohol): Cranium dorsally dark mahogany brown, paler ventrally; dorsal pattern faint. Antennae almost concolorous with cranium, basal two segments and distals becoming golden brown. Eyes lavender black, slightly darker than cranium. Labrum concolorous with cranium, other mouthparts medium brown. Thorax, legs, and abdomen basically pale tan; pronotum and marginal sclerites of pterothorax mottled with dark brown; abdominal tergites mottled with a symmetrical pattern; ventral surfaces of thorax and abdomen immaculate pale tan. All legs with tibiae and tarsi faintly tinged with dark brown. Wings uniformly dark brown with very narrow hyaline stripes and lacking white cross-veins. Abdominal terminalia pale straw yellow, immaculate; basal segments of cerci concolorous with tenth segment, distals smoke brown. Dimensions (on slide): Body

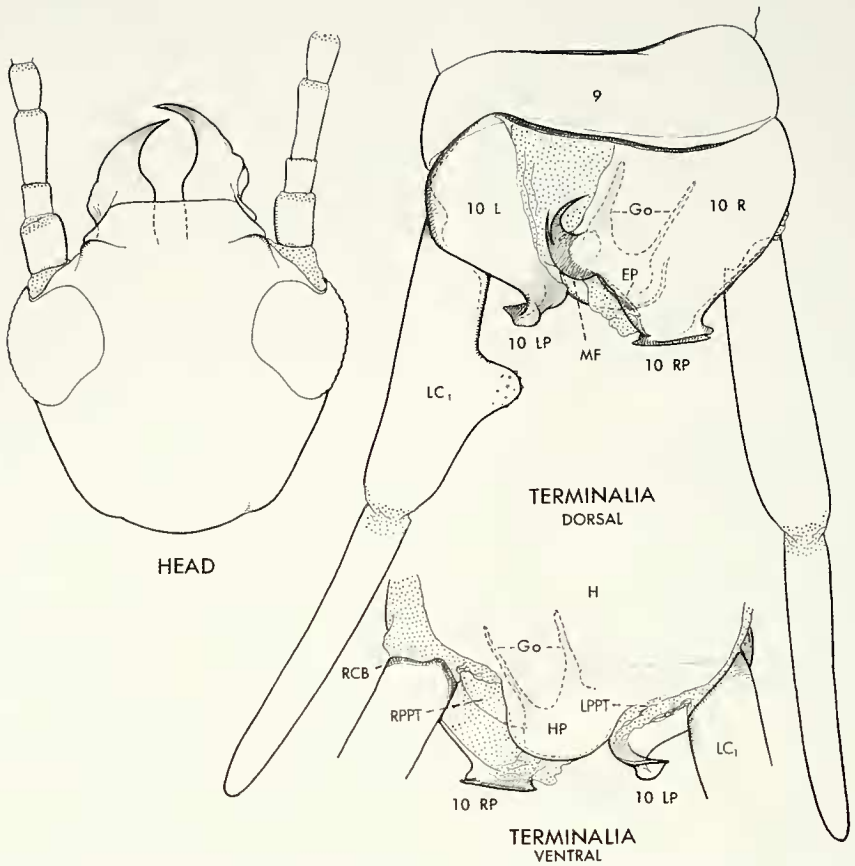

FIGURE 29. *Platyembia tessellata* Ross, new species, holotype. Type locality: Peru: Rio Tambopata, Madre de Dios.

length 8.5 mm; forewing length 5.4 mm, breadth 1.4 mm.

Important anatomical characters.—As figured.

Paratypes.—Several topotypic males from holotype's culture, CAS, USNM, and MUSM.

Additional records (all CAS).—Peru: Yurac Plantation, 67 mi E Tingo Mariá, X-54, in sheet webs on small trees, no mature males (E. S. Ross). Brazil: Near Caxias, Rio Medio Javari, Amazonas, 20-III-63 (D. Lacombe). Brazil: Uaupés (4 km N of Convento) Rio Negro, 3-I-63 (D. Lacombe).

Cryptembiinae Ross
new subfamily

Type genus.—*Cryptembia* Ross, new genus by present designation.

Distribution.—South America: Amazon Basin, north into S Colombia and S Venezuela.

Diagnosis.—Males small to moderately large (body length 7–11 mm); always alate. Usually darkly and uniformly pigmented but in some species the prothorax is reddish and in others the antennal apices, coxae, trochanters and one or both cercus segments are white. Mandibles small, apices acutely pointed, without a medial flange. Submentum small, quadrate, weakly sclerotized. Wings with entire length of RBS separated from C; wing vein sclerotization interspecifically variable, cross-veins present or absent behind RP; hyaline stripes very narrow, sharply defined; vannal area unusually large. Hind basitarsi elongate, apically tapered; plantar setae varied in form and angle, terminally reduced to a single row; without a second papilla. Tenth abdominal tergite diagonally cleft leftward to its base; left process (10 LP) in some species broad, short and twisted leftward, in others its apex is broadly bifurcate; right process (10 RP) short, stout, in others it is thin, broadly spatulate; in all species 10 RP lacks

FIGURE 30. *Platyembia tessellata* Ross, new species. Adult female showing tessellate body maculation and flattened form. Sclerogibbid wasp larva attached. Locality: Peru: Yurac Plantation, west of Pucallpa..

hooks or talons. Inner, mid-portion of 10 R usually with a sclerotic, elevated "mound," varied in size. Epiproct (EP) a prominent, elongate, parallel-sided sclerite attached to inner-apex of 10 RP, extended forward in cleft and often terminated by a small sclerotic spine directed dorsad. In the cleft membrane immediately forward of this spine there is a small, microspiculate, membranous elevation. Hypandrium process (HP) broad, medial with a broadly arcuated rim lacking processes or spiculation. Paraprocts usually membranous swellings with sclerotic fragments fused to basal angles of HP. Lobe of left cercus (LC_1) inner-apical, densely echinulate. Basal rim of right cercus partly sclerotized and flanged.

Females.—Not studied for subfamily characters.

Discussion.—This subfamily appears to be somewhat intermediate between Anisembiinae and Chelicercinae. The most distinctive character is the narrow sclerotic process (EP) directed forward in the tenth tergite's cleft from an attachment on the inner-apical side of 10 RP. It isn't certain that this is an epiproct. It may prove to be a highly modified medial flap (MF). A similar projection is present in the apparently plesiomorphic chelicerine new genus *Brasilembia,* but this genus is distinct in several characters, such as the very large "talon" on 10 RP and the well sclerotized paraprocts attached to the caudal angles of HP. Another peculiarity of most species is a small, sclerotic mound on the mid-mesal surface of 10 R. To date, the subfamily includes only the following genus.

Genus *Cryptembia* Ross

new genus

Type species.—*Cryptembia amazonica*, new species, by present designation.

Name basis.—Greek *krypto* = hide, conceal, in reference to obscure galleries.

Distribution.—That of the subfamily.

Diagnosis.—Until related new genera are discovered, *Cryptembia* may be recognized by the subfamily characters.

Component species.—These show considerable variation from the rather generalized type species, *C. amazonica*, with its more complete wing venation, to apomorphic types. The scattered occurrence of the species indicates that the genus is composed of many more species occurring in intermediate regions. One species from Colombia, here named *C. anandra*, apparently is parthenogenetic. It is tentatively assigned to *Cryptembia* on the basis of size, coloration, and hind basitarsal characters.

Biology.—All species produce inconspicuous, often completely obscured galleries. *Cryptembia amazonica* was found on under-surfaces of fresh-cut logs and bark chips lying on leaf litter in a seasonally-dry forest. The galleries of other species are concealed in bark crevices. Exposed galleries are coated with finely pulverized bark, or feces. *Cryptembia anandra* occurs in bark crevices and in road banks.

KEY TO SPECIES OF *CRYPTEMBIA*

(Adult males)

1. Right process (10 RP) broad, thin, spatulate; mesal surface of right hemitergite (10 R) without a "mound" (*Rondonia* Group) 2

— 10 RP tapered, thick, not spatulate; mesal surface of 10 R with a conspicuous "mound" (*Amazonica* Group) 3

2. Head and most of prothorax brilliant golden yellow, remainder of body and its appendages almost black. Rondônia Prov. ..... *rondonia*

— Head, body and appendages uniformly brown. East-central montaña zone, Peru ..... *fusca*

3. Prothorax paler than remainder of body 4

— Prothorax and body uniformly brown 5

4. 10 LP small, its apex sharp. EP broad, its sides broadly arcuate. Central Peru ..... *multicolor*

— 10 LP bifurcate. EP narrow, sides straight. S Colombia ..... *macoae*

5. 10 LP bifurcate. EP broad, its sides asymmetrical. S Venezuela, crest of Mt. Duida ..... *caprilesi*

— 10 LP not forked. EP narrow, sides parallel, symmetrical 6

6. 10 LP flat, broad, on a single plane (not slanted). Brazil: Manaus region ..... *manauara*

— 10 LP thick, slanted ventrad on left side. Brazil: lower Rio Amazon 7

7. Apical segments of cerci white. North shore Rio Amazon ..... *amazonica*

— Cerci entirely brown. Brazil: Belém region .... *paraense*

Note: *Cryptembia anandra* n. sp., of Colombia cannot be keyed at this time because it is parthenogenetic.

AMAZONICA GROUP

Male terminalia with a prominent inner "mound" on 10 R; EP usually parallel-sided, well separated from inner margin of 10 R; 10 RP tapered caudad, thick.

Cryptembia amazonica Ross

new species

(FIGURE 31)

Holotype.—Male, on slide, CAS. Data.—Brazil: Vila Amazonas, near Macapá, Amapá, matured in culture 9-VII-64 (E. S. Ross).

Description.—Appearance: Moderately large, alate; body vestiture unusually long. Generally dark mahogany brown, antennae paler with apices white; coxae and trochanters of all legs pure white, tibial bases of mid- and hind legs white; apical segments of cerci white. Color details (in alcohol): Cranium without pattern, dark mahogany brown, surface finely alutaceous. Eyes lavender, paler in tone than cranium. Antennal segments 1–19 medium brown margined with piceous brown; segment 20 brown basally, paler distad; segments 21–23 white. Mouthparts dark brown. Prothorax concolorous with cranium, sclerites and membranes between pro- and mesothorax also con-colorous with cranium. Mesonotum basically dark creamy white but clouded with dark mahogany brown anteriorly; dorsal membranes creamy white, the mesothorax therefore appears contrastingly pale; sides and venter reddish mahogany brown. Metathorax varied shades of mahogany brown, dorsum much darker than mesothorax. Legs dark mahogany brown except for white coxae, trochanters and femorotibial joints of mid-

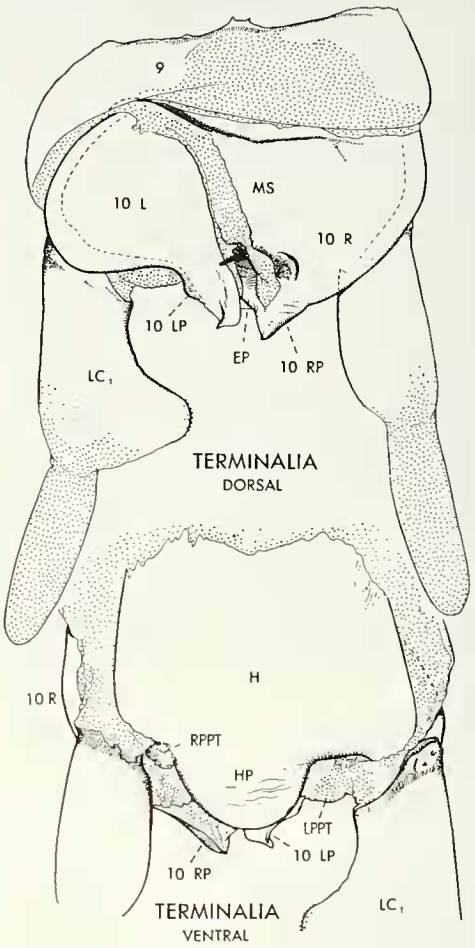

FIGURE 31. *Cryptembia amazonica* Ross, new species, holotype. Type locality: Brazil: near Macapá, Amapá.

and hind legs. Wings basically medium brown, hyaline stripes very narrow, veins well sclerotized except for MP and Cu. Abdomen, including terminalia and basal segments of cerci, including joint membranes, dark purplish mahogany brown; apical segments of cerci creamy white. Dimensions (on slide): Body length 10.5 mm; forewing length 6.5 mm, breadth 1.5 mm.

Important anatomical characters.—As figured.

Allotype.—Female, in alcohol (CAS), from holotype's culture.

Description.—Moderately large. Cranium clouded reddish mahogany brown, without pattern. Eyes dark lavender, same tone as cranium. Antennal segments 1–17 mahogany brown, 18 terminally pale, 19–22 creamy white. Pronotum piceous black (darkest portion of specimen), prosternum paler; adjacent membranous areas dark purple. Meso- and metathoracic sclerites dark mahogany brown, clouded dorsally with piceous brown; dorsal intersegmental membranous areas creamy white, thus forming a pale intersomital band; thoracic membranous areas laterally and ventrally dark purple. Forelegs with coxae and trochanters golden brown; femorotibial joint creamy white; other leg portions mahogany brown. Mid-legs with coxae, trochanters, femorotibial joints and entire tarsi creamy white, otherwise mahogany brown. Hind legs similar to mid-legs but with only the terminal tarsal segment creamy white. Abdomen reddish mahogany brown dorsally, much paler ventrally; basal cercus segments mahogany brown, apicals tan. Body length 14.0 mm.

Paratypes.—13 adult males from type culture, matured between 12-VI and 29-VII-64. Deposited in CAS, USNM, MNRJ, and MZUSP.

Biology.—The type cultures were collected in a residual patch of high, tropical forest growing on lateritic soil. The region is subject to a prolonged dry season and thus the trees have little epiphytic growth. Colonies were found on the under-surface of six-foot-long logs (cut for charcoal burning) lying on leaf and twig litter on the ground. Immature embiids were found in short galleries which followed bark crevices. The silk was gray-white and dusted with pulverized material. Laboratory cultures did not thrive and the type series is composed only of adults which matured from field-collected nymphs.

Cryptembia paraense Ross

new species

Holotype.—Male, on slide CAS. Data.—Brazil: Mata da Pirelli, Marituba, Pará, 18-III-64 (E. S. Ross). In a high, virgin rain forest.

Name basis.—Refers to Pará, the type locality's region.

Description —Appearance: Size medium, alate, resembling *C. amazonica*. Uniformly dark brown except for white antennal apices, femorotibial joints, and coxae and trochanters of all legs. Color details (in alcohol): Cranium dark mahogany brown except for a faint, paler "cloud" between eyes and a paler venter. Eyes dark lavender, almost as dark as cranium. Antennal segments 1 and 2 dark brown, 3–20 medium brown to tan, 21 yellow tan, 22–25 white (complete). Mouthparts uniformly dark brown, slightly darker than cranium. Remainder of specimen varied shades of mahogany brown, including pleural membranous areas. All femorotibial joints white, all coxae and trochanters creamy white, mid- and hind basitarsi tan blending to white at base, mid-tarsal segments white, distal segment pale tan. Mesosternum creamy yellow caudally; sclerites and membranous areas between meso- and metathorax with contrasting dark setae. Wings medium brown with very narrow hyaline stripes, the one cross-vein between branches of MA is white when crossing its stripe. Terminalia mottled mahogany brown, except as follows: thin inner apex of 10 LP white, EP piceous, HP dull yellow amber, paraprocts (fused to HP) piceous; all segments of cerci mahogany brown. Dimensions (on slide): Body length 9.0 mm; forewing length 6.0 mm, breadth 1.7 mm.

Important anatomical characters.—Similar to *C. amazonica* but overall more sclerotic; pale apical flanges of 10 LP broader; apex of 10 RP more complex with a dorsal and a ventral portion (that of *C. amazonica* a simple cone); LC_1 lobe smaller and more narrowly cone-shaped.

Discussion —In spite of the richness and density of the habitat, only the holotype of this species was found. Undoubtedly the several species of embiids likely to occur in the forest would have been easier to collect if a portion of the forest had been cleared (but not burned) for limited native agriculture. *Cryptembia paraense* shares with *C. amazonica* similar coloration, including white antennal apices,

but the coxae and trochanters of the latter are much whiter and, more important, the apical antennal segments are pure white; also, both segments of the cerci are brown in *C. paraense*, the distal segments are white in *C. amazonica*. It should be noted that the two species are widely separated by the great width of the Amazon River's mouth, including vast Iha de Marajó. Also, there are significant life zone differences. The type locality of *C. amazonica* is drier and borders grasslands; that of *C. paraense* is wet, high rain forest.

Cryptembia manauara Ross

new species

(FIGURE 32)

Holotype.—Male, on slide, MNRJ. Data.—Brazil: 10 km N Manaus, 24-IV-64 (E. S. Ross).

Name basis.—Named after local Indian tribe at Manaus, which also is the basis for the city's name.

Description.—Appearance: Moderately large, uniformly dark brown. Color details (in alcohol): Cranium dark chestnut brown, eyes black, all 20 antennal segments brown (complete). Legs chestnut brown except for creamy white femorotibial joints. Terminalia brown, cleft membrane white; outer portion of left process (10 LP) yellow, inner portion gray-white; LC_1 lobe piceous brown, all cercus segments chestnut brown. Dimensions (on slide): Body length 11.0 mm; forewing length 7.0 mm, breadth 2.0 mm.

Important anatomical characters.—Left tergal process (10 LP) broad on a flat plane, outer basal margin with two small sclerotic projections, caudal margin arcuate, inner side thick; right tergal process (10 RP) nodulose, sclerotic. Epiproct sclerite (EP) prominent, its forward end with an especially large, acute, dorsally-directed spine. Mesal nodule of right hemitergite (10 R) large, dimpled at forward end. Cercus segments relatively short.

Females.—No specimens.

Paratypes.—Four males from holotype's culture, CAS, and National Research Institute of Amazonia (INPA).

Habitat.—An area of second growth around a caboclo's home ("sitio"). Scattered, coarse-barked, large, residual, primary forest trees created heavy shade. Colonies of *Clothoda nobilis* were common, also those of *Oligotoma saundersii* and *Pararhagadochir bicingilata*. Colonies of *Cryptembia* were difficult to find because the broad galleries were coated with fine debris—perhaps pulverized feces. When the galleries were opened, smaller galleries of nymphs were exposed. The culture didn't thrive, only five males matured.

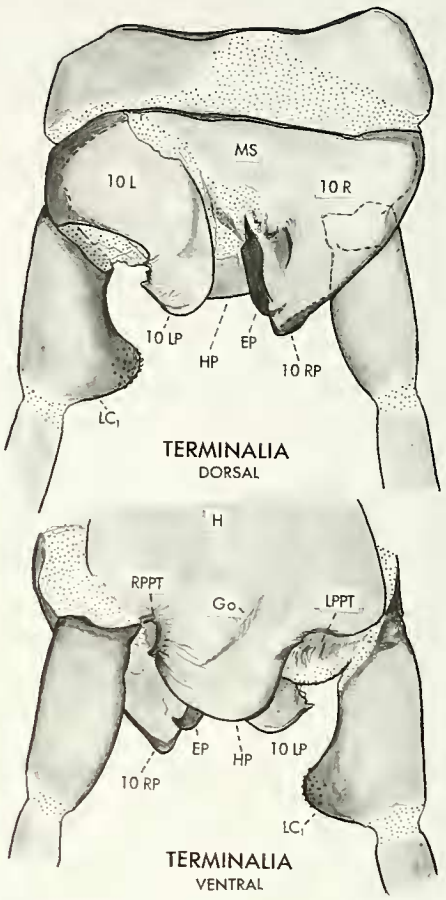

FIGURE 32. *Cryptembia manauara* Ross, new species, holotype. Type locality: Brazil: near Manaus.

Cryptembia caprilesi Ross

new species

(FIGURE 33)

Holotype.—Male, on slide, USNM. Data.—Venezuela: Crest of Mt. Duida, 2396 m elev., Territ. Amazonas, 2-3-VI-50 (J. Maldonado Capriles).

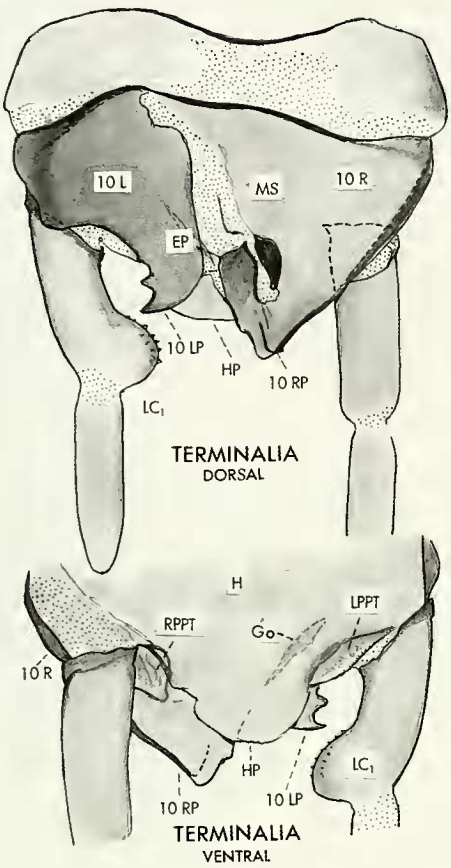

FIGURE 33. *Cryptembia caprilesi* Ross, new species, holotype. Type locality: Venezuela: Mt. Duida, Amazonas.

Description.—Appearance: Relatively small; almost uniformly dark brown throughout, including all portions of legs, cerci, and antennae at least through segment 14 (others broken off). Cranium rather narrow, eyes separated by two and one-half eye-widths. Hyaline stripes of wings very narrow, sharply defined, most veins represented only by lines of setae; cross-veins absent except for faint indications between RBS and RP. Terminalia: 10 L and 10 LP very dark, evenly sclerotized, the latter on a flat plane, bifurcate. Mesal nodule of 10 R conspicuous, almost black; 10 RP conical. Epiproct (EP) large, broad, dark; point at forward end short, almost black. Hypandrium process (HP) broadly arcuate, its rim weak. Dimensions (on slide): Body length 6.0 mm; forewing length 4.2 mm, breadth 1.2 mm.

Females. — No specimens.

Discussion.—Because of its occurrence at high altitude (2396 m), it isn't surprising that this is the smallest *Cryptembia*. It is also characterized by its broadly emarginate 10 LP and very broad epiproct (EP).

Cryptembia multicolor Ross

new species

(FIGURE 34)

Holotype.—Male, on slide, CAS. Data.—Peru: Yurac Plantation, 67 mi E of Tingo Mariá, Huánuco, 14-XII-54 (E. S. Ross). In bark of stumps.

Description.—Appearance: Rather small, winged; dark mahogany brown with contrasting golden yellow prothorax, light brown legs and white apical cercus segments. Color details (in alcohol): Cranium glossy mahogany brown, clypeus paler; eyes black, narrowly outlined with creamy white; antennae medium brown, segments 1 and 2 darker, other gradually paler distad, 18 segments (incomplete). Prothoracic and cervical sclerites golden tan; other body sclerites dark mahogany brown, tinged with piceous in sclerotic areas; pterothoracic membranous areas dark lavender. All legs, including coxae, uniformly brown. Wings dark brown with very narrow, sharply defined, hyaline stripes; RBS not merged with costa, its borders and costal margins "granular" brick red; MA + RP and cubital blood sinus medium brown. Sclerotic portions of terminalia dark brown, apical cercus segments pure white. Dimensions (on slide): Body length 7.5 mm; forewing length 5.1 mm, breadth 1.4 mm.

Allotype.—Female, in alcohol, CAS. Data.—reared in holotype's culture.

Description.—Cranium dull mahogany brown, slightly clouded with chestnut brown between eyes; preclypeal membranous area creamy white. Prothoracic sclerites yellow tan, all other body sclerites very dark mahogany brown. Legs concolorous with thorax except mid- and hind trochanters and coxae are creamy white. Both cercus segments pale tan. Body length 8.0 mm.

Habitat.—The above types, the only known specimens, were collected in debris-covered galleries on the bark of a stump, at the edge of primary

forest. A very distinct congener, *C. fusca*, was collected in the same locality. *Cryptembia multicolor* is distinguished at a glance by its golden tan prothorax and white distal cercus segments. *Cryptembia fusca* is uniformly brown.

Cryptembia macoae Ross

new species

(FIGURE 35)

Holotype.—Male, on slide, CAS. Data.—Colombia: Macoa, Nariño, 2-III-55 (E. S. Ross).

Description.—Appearance: Size medium, alate, almost uniformly medium brown throughout, including all appendages.

Important anatomical and color characters.—Cranium oval, medium brown without pattern; eye-interspace three eye-widths. Antennae 22-segmented, uniformly brown to apex. Prothorax golden tan, paler than pterothorax. All legs, including coxae and trochanters, uniformly medium brown. Wings medium brown with very narrow hyaline stripes; RBS not merging with C, its margins and C bright red; 5 cross-veins between MA + RP and RP light brown—no others on wing. Abdomen medium brown with darker terminalia, structures, as figured; cerci entirely creamy white except for darker inner margin of LC_1. Dimensions (on slide): Body length 8.5 mm; forewing length 6.5 mm, breadth 1.6 mm.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

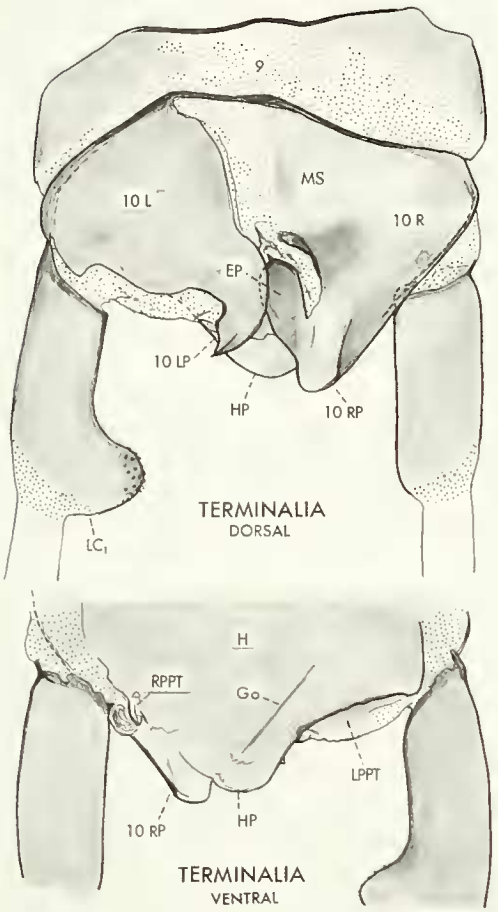

FIGURE 34. *Cryptembia multicolor* Ross, new species, holotype. Type locality: Peru: east of Tingo Mariá, Huánuco.

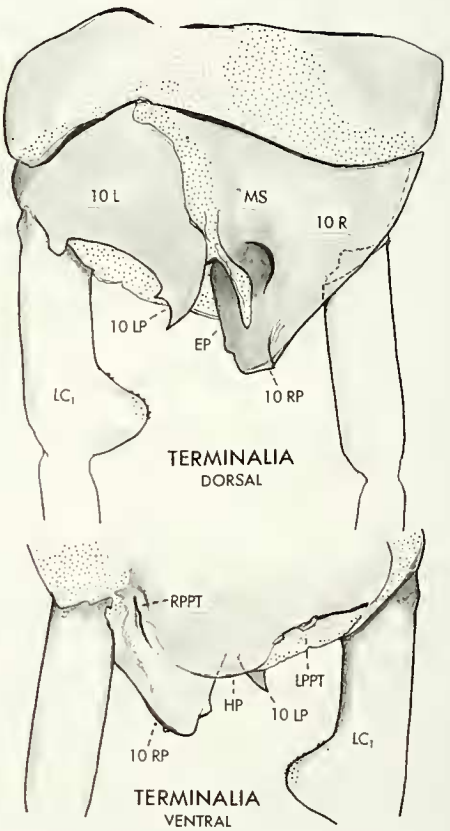

FIGURE 35. *Cryptembia macoae* Ross, new species, holotype. Type locality: Colombia: Macoa, Nariño.

Description.—Cranium and segments 9 and 10 of abdomen dark chocolate brown; antennae pale tan, 19-segmented (complete). Prothorax, acrotergite and forelegs yellow tan. Other body sclerites medium brown; mid-legs tan, hind legs largely medium brown; cerci entirely creamy white. Body length 10.0 mm.

Parallotypes.—Four adult females (CAS) from holotype's culture.

Discussion.—As indicated by its emarginated 10 LP, *C. macoae* is somewhat related to *C. multicolor* from Peru but differs, as follows: 10 LP is more broadly and deeply emarginated, EP is narrower and more parallel-sided, its cerci are entirely pale whereas those of *C. multicolor* have dark basal segments. A culture was established from specimens in the bark of trees in a fence bordering a pasture.

A second, much smaller male matured but isn't designated a paratype because the tips of 10 LP's branches are truncate, possibly broken off.

RONDONIA GROUP

Male terminalia without an inner "mound" on 10 R; EP irregular, closely appressed to inner-apical margin of 10 R; 10 RP broad, thin, spatulate.

Cryptembia rondonia Ross

new species

(FIGURE 36)

Holotype.—Male, on slide, CAS. Data —Brazil: Schmidt Farm, 67 km SW Ariquemes, Rondônia, 187 m, matured in culture VI-92 (E. S. Ross).

Description.—Appearance: Size medium (body length 10.2 mm), alate; uniformly very dark brown except for bright golden head and prothorax. Color details (in alcohol): Cranium brilliant golden yellow with faint pattern, anterior half tinged with light brown, setae black. Eyes blackish lavender. Antennae dark chocolate brown, becoming tan distad; 27-segmented (complete). Pronotum and cervical sclerites, and all other body sclerites and appendages mahogany brown, membranous areas dark purple; terminalia dark brown except for tan distal segments. Dimensions (on slide): Body length 10.2 mm; forewing length 1.75 mm, breadth 1.75 mm.

Important anatomical characters.—As figured. Significant is the slender EP sclerite and the deeply emarginated 10 LP with the outer point well separated from 10 L.

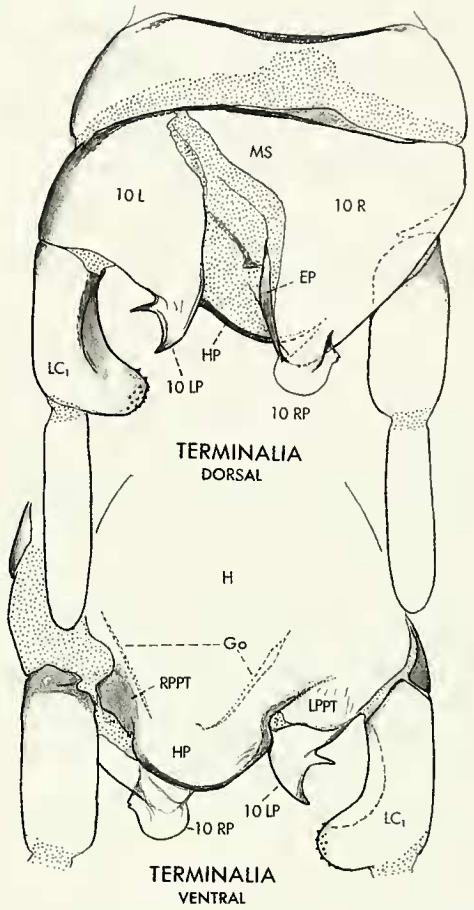

FIGURE 36. *Cryptembia rondonia* Ross, new species holotype. Type locality: Brazil: 67 km SW of Ariquemes, Rondônia.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—All body sclerites dark mahogany brown; all membranous areas dark lavender or rust white, except as follows: Cranium lighter mahogany brown clouded with chestnut brown between eyes and forward on each side of antennal bases to the clypeal angles. Antennae dark mahogany brown at base blending to medium brown distad, apical segments not white, 23-segmented (complete); membranous areas between meso- and metanotum paler than others, thus forming an indistinct intersomital

band; cerci entirely dark brown, including membranes. Body length 10.0 mm.

Paratypes.—Eight males from holotype's culture deposited in CAS, USNM, and MZUSP. No parallotypes.

Habitat.—Bark of trees in high forest, galleries obscured by dense powdering of debris.

Cryptembia fusca Ross
new species
(FIGURE 37)

Holotype.—Male, on slide, CAS. Data.—Peru: Yurac Plantation, 67 mi. E Tingo Mariá; matured in culture XI-54 (E. S. Ross).

Description.—Appearance: Small; uniformly light chestnut brown, membranous areas only slightly paler, antennae unicolorous tan, 18-segmented (complete); cerci, including joint membranes, medium brown. Dimensions (on slide): Body length 7.0 mm; forewing length 5.0 mm, breadth 1.2 mm.

Important anatomical characters.—As figured. Significant: the longitudinally triangular EP sclerite; the broadly emarginated 10 LP with its outer point small and closely appressed to the caudal margin of 10 L. A flat microstrigose area is present on 10 R in the position of the elevated "mound" (present in species of the *Amazonica* Group).

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—All body and head sclerotization varied shades of dark chestnut brown, all leg and cercus segments concolorous; all membranous areas pale lavender except those between meso- and metathorax which are creamy white, thus forming a pale intersomital band; the membranous areas otherwise not very much paler than sclerotized surfaces. Antennae uniformly medium brown, only slightly paler than cranium; 16-segmented (complete). Body length: 8.0 mm.

Paratypes and parallotypes.—Numerous males and females reared in holotype's culture. Deposited in CAS, USNM, MUSM, MHNP, and MZUSP.

Habitat.—Colonies were found in mossy bark of a small stump, often beneath larger galleries of *Clothoda longicauda* Ross. All developmental stages and adults were present 12-XII-54 (E. S. Ross).

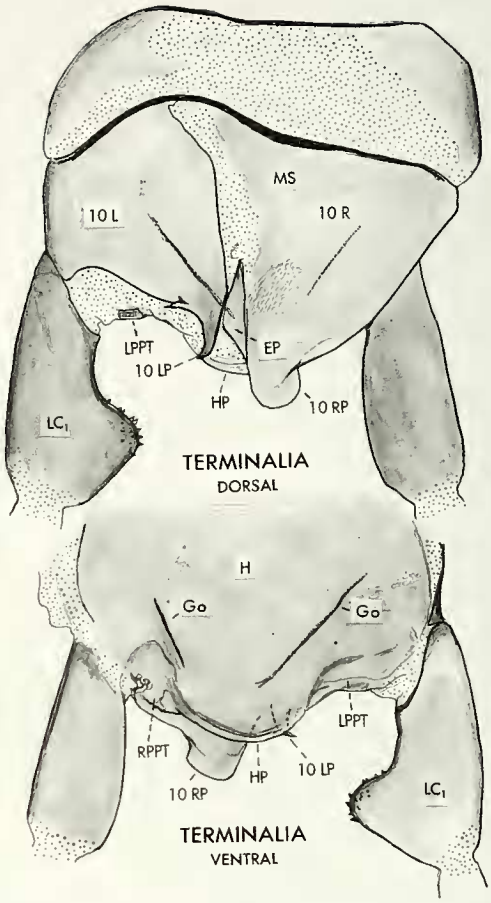

FIGURE 37. *Cryptembia fusca* Ross, new species, holotype. Type locality: Peru: east of Tingo Mariá, Huánuco.

Additional record —Colony in moss on orange tree bark. Peru: Quebrada de las Cuevas, near Tingo Mariá.

INSERTAE SEDIS

Cryptembia anandra Ross
new species
(FIGURE 38)

Holotype.—Female, on slide, CAS. Data.—Colombia: 40 mi N of Popayán, 1530 m elev., matured in culture XII-54 (E. S. Ross).

Name basis.—Greek *anandros* = without men.

Description.—Appearance: Rather large (body length 13 mm); generally mahogany brown with

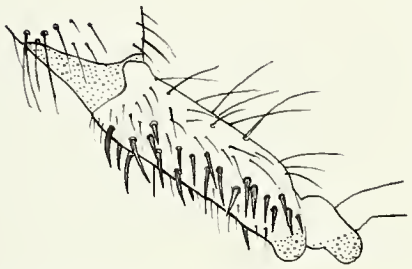

FIGURE 38. *Cryptembia anandra* Ross. Hind basitarsus of holotype. Type locality: Colombia: north of Popayán.

whitish mid- and hind coxae and trochanters. Color details (in alcohol): Head uniformly mahogany brown, lacking pattern; surface finely, evenly alutaceous, dull; mouthparts and antennae almost concolorous with cranium but more golden yellow; apical antennal segments becoming yellowish, finally creamy white. Prothorax slightly darker than cranium, its membranous areas and those of cervix dark lavender; fore coxae and trochanters golden brown, remainder of forelegs concolorous with pronotum except for tan tibial bases. Mesonotum concolorous with pronotum but meso-caudally becoming yellowish; its acrotergite and poststernum also largely yellowish; other mesothoracic sclerites and membranous areas mahogany brown with sternites golden brown. Metathorax similar to mesothorax but without yellowish areas. Mid- and hind coxae and trochanters creamy white, otherwise mahogany brown except for creamy white tibial bases and portions of tarsi. Abdominal tergites and pleurites concolorous with metathorax; sternites golden brown, paragenital sternites mostly tan to yellowish; basal segments of cerci dark brown, apical segments dark creamy white.

Important anatomical characters.—Hind basitarsi (Fig. 38) with characteristic chaetotaxi.

Paratype (CAS).—Female, in alcohol, matured in holotype's culture X-55.

Additional records.—Colombia: 15 mi S of Corinto, Cauca, 1140 m elev. (E. S. Ross), numerous females, mostly nymphal, died between III and IV-55. Colombia: 10 mi E of Ibaque, Tolima, 790 m elev. (E. S. Ross), 2 females, matured in culture 9-III-55.

Discussion.—This species appears to be parthenogenetic. It is the only large-sized species in its region with only one hind basitarsal papilla. Its assignment to *Cryptembia* is based on a comparison with similar-appearing females of *C. amazonica*. It is hoped that a bisexual population of the species eventually will be found. No *C. amazonica*-like *Cryptembia* has been found outside of the eastern Amazon River basin.

Habitat.—Colonies at Popayán were collected in a road bank crevice. At Corinto they were found in coarse bark flakes of large acacia trees. At Ibaque the species occurred in matted leaves beneath a small tree in a grassland area.

Subfamily Chelicercinae Ross

Chelicercinae Ross, 1984b:128.

Type genus.—*Chelicerca* Ross.

Distribution.—SW USA, and tropical America, except in West Indies.

Diagnosis (Males).—Wings, when present, usually narrow, RBS usually slanted into costa before wing apex, cross-veins absent behind RP. Cleft of tenth tergite complete to its base, slanted leftward. Left process (10 LP) broad, usually complex, left side often twisted downward. Right process (10 RP) never extended, usually short, rounded, at times obsolete; usually with one (rarely two) claw-like microprocesses ("talons") arcing from inner corner of 10 R across apex of 10 RP. Epiproct (EP) frequently a microspiculate fold which in extreme cases the concentration of spicules becomes a dark sclerotic arc. Hypandrium process (HP) broad, apex at times simple but usually complex with lobes and spiculation which, in an extreme case (*Dactylocerca*), has both the dorsal and a ventral surface sclerotized. Gonapophysis sclerites (GO) in cleared slide preparations may be visible as a pair of sclerotic "rods." In some species, e.g., of the genus *Schizembia*, they aren't developed. Left paraproct (LPPT) usually a dark, triangular sclerite isolated in the membrane opposite base of left cercus; portions of left and right paraprocts may be fused to caudal sides of HP. Left cercus segments often fused, the basal usually lobed, always echinulated; basal margin of right cercus usually sclerotic and asymmetrically flared.

Females.—Not studied for subfamily characters.

Discussion.—This very large, highly diversified assemblage of species requires division into several

genera. This task is difficult because several groups of species appear to form "peaks and valleys" of terminalia characters, as will be evident. For example, when comparing my illustration of species-groups presently placed in the large genus *Chelicerca* Ross. Some of these "peaks" may later be regarded as genera. The subfamily will require detailed analysis in a future study. Homologizing certain terminalia structures will be especially important, e.g., the medial flap (MF) and the epiproct (EP).

KEY TO GENERA OF CHELICERCINAE
(Males)

1. Cranium massive, form circular; eyes and antennae nymphaform; mandibles stout, form and dentation as in nymphs and females. Body exceptionally large, robust, nymphoid; always apterous. Known only from the Chilpancingo region of Guerrero, Mexico ..... *Pelorembia*

— Cranium normal, longer than broad; eyes and antennae adult in character; mandibles thin, without multiple subapical dentation. Body slender, usually small, apterous or alate. Widespread Neotropical occurrence 2

2. Tenth tergal cleft with a prominent forward-directed process arising from inner-apical corner of 10 RP. Paraprocts extensively sclerotized and attached to caudal margins of hypandrium (H). Southeastern Brazil ..... *Brasilembia*

— Tenth tergal cleft without a prominent forward-directed process arising from inner-apical corner of 10 RP. Paraprocts mostly membranous except for an isolated, dark, triangular sclerite in membrane between HP and base of left cercus 3

3. Caudo-mesal side of 10 R and inner-apex of 10 RP each with a "talon," or claw. Bahia region of eastern Brazil ..... *Oncosembia*

— Caudo-mesal side of 10 RP lacking a claw, only an inner-apical "talon" or claw is present, or no claw. Elsewhere in Neotropics 4

4. Left cercus (LC_{1+2}) always composite, apical segment not represented by a vestigial lobe; long, finger-like, often inwardly arcuated. Caudal margin of 10 R broadly semicircular, not narrowed as a process. Claw often greatly reduced on right extremity of caudal arc. HP very large, extremely complex, extensively sclerotized and often spiculate on its dorsal surface. Known only from NW Mexico and SW USA ..... *Dactylocerca*

— Left cercus two-segmented, or at least partially composite. If partially composite, it isn't strongly arcuated and the vestige of the distal segment is apparent as a setose lobe with line of fusion often evident. 10 R usually gradually narrowed to form 10 RP with a talon arising on inner corner and arcing laterad across apex of the process. HP small to large with caudal margin often complex but never with rim extended forward over its dorsal surface. Wide occurrence in Neotropical region 5

5. Inner apical margin of 10 RP folded ventrad and thence laterad as a weakly sclerotized, acute extension. Caudal margin of HP narrowly rimmed evenly arcuated (semicircular). Northern South America, including Trinidad. ..... *Schizembia*

— Inner apical margin of 10 RP not folded ventrad, thence laterad beneath the process. Caudal margin and sides of HP irregular in its rim and outline, often spiculated and lobed. Occurs throughout Neotropical region ..... *Chelicerca*

Genus *Brasilembia* Ross
new genus

Type species —*Brasilembia beckeri*, new species by present designation.

Distribution.—Southeastern Brazil.

Diagnosis.—Males alate, uniformly brownish black. Cranium oval; eyes moderately large, separated by two eye-widths; antennae uniformly brown, 17-segmented (complete); apices of mandibles narrowly acute, lacking subapical flanges or outer basal extensions. Thorax and legs uniformly dark brown. Hyaline stripes of wings narrow, margins sharply defined; RBS borders and costa pink; RP + MA, RP and extreme base of MA as well as the four cross-veins between RBS and RP, tan; balance of MA, MP and Cu_{1a} reduced to lines of setae; RBS not slanted into costa. Basal margins of abdominal terga 9 and 10 thinly sclerotized, almost straight. Tenth tergite broadly cleft to its straight basal margin; cleft membrane almost without visible structures, i.e., an epiproct, or spiculation. Left process (10 LP) very broad, horizontal, margins well defined but weak, with a longitudinal crease; outer margin irregular

but not forming a definite hook or "talon." Right hemitergite (10 R) abruptly narrowed, then broadened to form a thin, arcuate, caudal margin; inner caudal angle produced across the apex of 10 RP as a very large dagger-like, sharp process which slants forward and upward. From the base of this "dagger" a prominent, dark, irregularly-margined, narrow process (EP) projects forward in the cleft membrane and is well separated from inner margin of 10 R. Ejaculatory duct not bordered by sclerotic "rods," not even visible in cleared slide preparations. Hypandrium lobe (HP) broad, centered, its surface smooth and depressed; its caudal margin evenly arcuated, narrowly rimmed, lacking special structures, e.g., a spine or a nodule. Paraproct sclerites (LPPT and RPPT) fused to caudal sides of H; the left is largest and is extended to caudal margin. Both cerci two-segmented, basal segments with trichobothria conspicuous on all surfaces; basal segment of left cercus (LC_1) gradually incurved, not abruptly lobed.

Females.—Not studied for generic characters.

Discussion.—The type species is one of the two chelicerines as yet collected in southeastern Brazil. The other, occurs in Rio de Janeiro. The most significant character of *Brasilembia* is the extensively sclerotized LPPT broadly attached to H. In all other chelicerines the left paraproct is an unattached sclerite. In some specimens of *B. beckeri* the paraproct sclerites are very large (Fig. 39A) and therefore plesiomorphic. Also distinctive is the darkly melanized projection (tentatively labelled EP) in the tenth tergal cleft, and the exceptionally large, forward-slanted and upturned 10 RP "talon." The absence of gonapophysis sclerotization also is significant. To date only the following new species is known.

Brasilembia beckeri Ross

new species

(FIGURE 39)

Holotype.—Male on slide MNRJ. Data.—Brazil: Paineiras, Parque Nac. do Tijuca, above Rio de Janeiro, matured in culture V-99 (E. S. Ross). Colonies in mossy rock crevices along the cog-wheel railroad, opposite the train stop which once served the hotel (now closed) at Paineiras.

Name basis.—Named after Dr. Vitor Becker, one of Brazil's most productive entomologists and a helpful companion during some of my South American fieldwork.

Description.—As described in the generic treatment. Dimensions (on slide): Body length 7.25 mm; forewing length 5.5 mm, breadth 1.4 mm.

Allotype.—Female, in alcohol, MNRJ. Data.—Reared in holotype's culture.

Description.—Cranium chestnut brown with faint darker brown pattern. All dorsal body sclerites and legs varied shades of medium brown; ventral body sclerites pale translucent amber yellow, except paragenital sternites which are tan; cerci tan. Body length: 9.0 mm.

Paratypes and parallotypes.—Numerous males and females from the holotype's culture deposited in CAS, USNM, BMNH, and MZUSP, and other important museums.

Additional records (all SE Brazil).—Parque Nac. do Itatiaia, (east slope), 2100 m, in moss hanging from a road bank (E. S. Ross); Santa Catarina: 20 km N Itajaí (E. S. Ross); Santa Catarina: near Barra Velha, 50 m (E. S. Ross). Santa Catarina: Rondon (F. Plaumann). Santa Catarina: 15 km W Blumenau, in road bank (E. S. Ross).

Habitat.—This, a vigorous, easily cultured species, occurs throughout SE Brazil, apparently mostly in Atlantic forest habitats from near sea level to as high as 2100 m elev. It is most often encountered in moss and crevices of trail and road banks.

Genus *Schizembia* Ross

Schizembia Ross, 1944:440.

Type species.—*Schizembia grandis* Ross, by original designation.

Name basis.—Greek *schiza* = splinter, in reference to tenth tergite's cleavage.

Distribution.—Northern South America, including Trinidad.

Diagnosis (males).—Cranium without noteworthy features; mandibles small, short, without acute projection of outer bases, subapical curvatures without a flange. Basal margin of ninth abdominal tergite usually straight, usually without pronounced emargination, thinly sclerotized; the tergite extensively membranous medially. Basal margin of tenth tergite likewise almost straight, thinly sclerotized. Tenth tergite's cleft complete to basal margin; almost straight and broadly so in *S. grandis* and *S. bryophila,* but slanted leftward and tapered in other

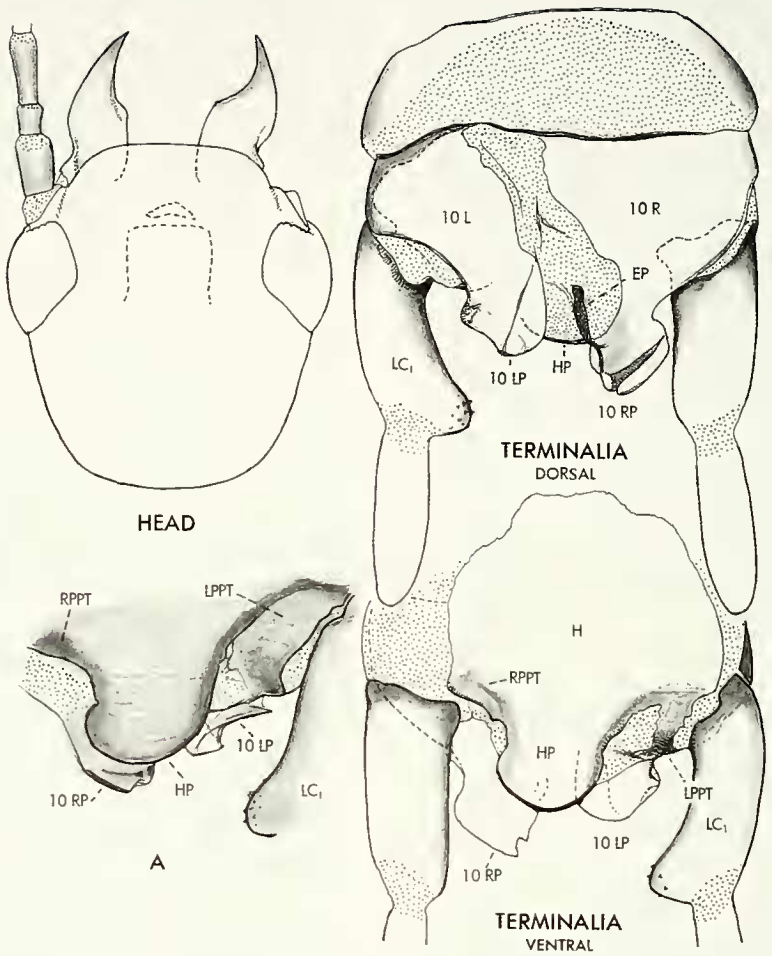

FIGURE 39. *Brasilembia beckeri* Ross, new species, holotype. Type locality: Brazil: Paineiras, above Rio de Janeiro. 39A. Detail of ventral terminalia structures.

species. Cleft membrane entirely membranous except for slight, longitudinal microspiculate creases which may weakly represent the epiproct (EP), which otherwise isn't apparent. Left tergal process (10 LP) varying from thin and flat, with a minute spine, to a leftward down-twisted condition with a larger spine. Right process (10 RP) of most species with a prominent, inner, carinate margin terminated caudally by a small spine in right corner; inner margin abruptly folded ventrad as a scarcely visible, tapered process. Hypandrium process (HP) large, centered, with margins sclerotized; its caudal margin semicircular with an evenly-margined, unbroken rim lacking a process or spiculation. Left paraproct (LPPT) a dark, unattached, triangular sclerite at inner base of the left cercus. Left cercus always two-segmented with a prominent, inner-apical, echinulate lobe on the basal segment; distal segment normal, never even partially absorbed into the basal.

Females.—Not studied for possible generic characters.

Discussion.—I described *Schizembia* during an early period of research based on a limited collection. Later (Ross, 1984:30) I decided that the genus was a synonym of *Chelicerca*. Now, with a much

larger collection, and realization that *Chelicerca* is a huge, diversified complex of species, it warrants division into several genera which exhibit increasing terminalia complexity. With *Brasilembia* Ross, *Schizembia* displays the most plesiomorphic characters in this series.

The forward projection of the inner corner of 10 RP into the cleft of *Brasilembia* may be a homolog of the ventral, laterad extension of 10 RP in *Schizembia*. It is possible that this extension has rotated counterclockwise to become the forward projection in the cleft of *Brasilembia*.

KEY TO SPECIES OF *SCHIZEMBIA*

(Males)

1. Inner margin of 10 RP narrowly, longitudinally carinate; not hirsute 2
— Inner margin of 10 RP not carinate, weakly sclerotized, finely hirsute. Trinidad ..... *hirsuta*
2. Left tergal process (10 LP) with a single, usually minute barb, or micro-talon 3
— 10 LP bifurcate (on a single plane). Western Venezuelan lowlands ..... *guanare*
3. 10 LP flat, smooth-surfaced, not twisted downward on left side; carinate inner margin of 10 RP almost straight, its barb or talon minute 4
— 10 LP surface longitudinally carinate, twisted downward on left side; carinate inner margin of 10 RP arcuate and basally forked, its talon conspicuous. Coffee growing zone of Colombia ..... *colombiana*
4. Small species with apex of 10 RP narrowly tapered, margins not carinate; surface of hypandrium process (HP) transversely rugulose. Trinidad ..... *callani*
— Moderately large species with apex of 10 RP broad, almost truncate, caudal margin carinate; surface of HP smooth. Mountain range west of Caracas, Venezuela 5
5. Cranium oval with sides behind eyes curved; eyes relatively small, interspace two and one-half eye-widths. Colonia Tovar ..... *grandis*
— Cranium broad, sides behind eyes short, straight, strongly convergent; eyes very large, interspace less than one eye-width. Rancho Grande, damp rain forest ..... *bryophila*

GRANDIS GROUP

Composed of five species having inner margin of right tergal process with a strong longitudinal carina and not hirsute.

Schizembia grandis Ross

(FIGURE 40 B)

Schizembia grandis Ross, 1944:441; plate 19B; figs 67–69.—Szumik, 1996:52 (discussion).

Holotype.—Male, on slide, USNM. Data.—Venezuela: In a shipment of *Cattleya* orchids shipped from Caracas and intercepted in U.S. Plant Quarantine.

Fixed type locality.—Obviously, the above orchids weren't collected within the city of Caracas, however, they were very likely gathered nearby. A frequently-visited and accessable locality a short distance west of Caracas, the German community, Colonia Tovar, Aragua, is here fixed as the type locality of *S. grandis*. My culture of this species was collected 15 km E at about 1750 m elev. in a natural forest of small trees.

A short distance west, at lower altitude, about 750 m, in a wet rain forest, a larger series was cultured from stock collected on mossy road banks 3 km N of Rancho Grande, Aragua, (north of Maracay). Males in this series closely resemble those from near Colonia Tovar except in their consistently larger eyes (Fig. 40A), much paler coloration in both sexes, and minor anatomical characters. With some hesitation this series is believed to be a distinct species, or at least a subspecies of *S. grandis*. Colonia Tovar and Rancho Grande are only approximately 75 km apart (airline), but have habitat and altitudinal distinctions.

Plesiotype male, by present designation, on slide, CAS. Data.—Venezuela: 15 km E Colonia Tovar, matured in culture 1-III-87 (E. S. Ross),

Description.—Cranium very dark mahogany brown, eyes blackish. Basal antennal segment golden brown, other segments at first yellow tan, becoming light brown distad, 18-segmented (complete). Prothorax light brown, membranous areas creamy white. Pterothoracic sclerites medium brown, clouded with dark mahogany brown; membranous areas dark creamy white. All legs medium brown, forelegs darker; bases of tibiae of all legs creamy white. Abdominal sclerites medium brown mottled subcuta-

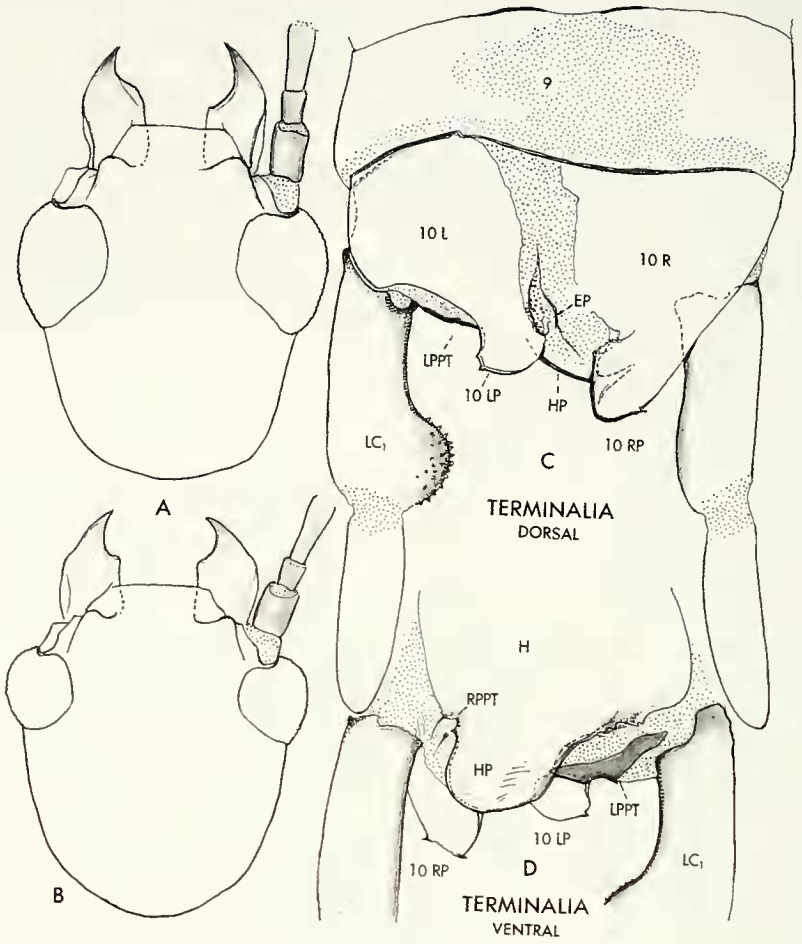

FIGURE 40 A, C, D. *Schizembia bryophila* Ross, new species, holotype. Type locality: Venezuela: Rancho Grande, Aragua. 40 B. *Schizembia grandis* Ross, head. Type locality (fixed): Venezuela: 15 k W Colonia Tovar.

neously with dark brown; tenth tergite and basal segments of cerci dark brown, distal segments pale tan. Dimensions (on slide): Body length 9.0 mm; forewing length 8.0 mm, breadth 2.2 mm.

Important anatomical characters.—Cranium (Fig. 40B) elongate oval; eyes relatively small, short, laterally protruded, cranial interspace two and one-half eye-widths. Terminalia as figured for *S. bryophila* n. sp., but differing as follows: microspines on tenth tergal processes slightly larger, ventral process of 10 RP more slender and elongate; base of LC_1 usually more elongate and more abruptly lobed (that of *S. bryophila* shorter, its lobe gradually expanded).

Neallotype.—Female, in alcohol, CAS. Data.—From plesiotype's culture.

Description.— Cranium almost black, luster dull; antennae pale yellow in basal half, grading to tan distad. Prothoracic sclerites and acrotergite 1 light chestnut brown with creamy white membranous areas. Mesonotum dark mahogany brown becoming golden tan caudally, pleural sclerites blackish brown; acrotergite 2 and prescutum translucent pale amber, adjacent membranous areas whitish, thus forming a pale intersomital band. Metathorax with coloration similar to that of mesothorax, but paler. Legs, including all coxae, shades of mahogany brown. Abdominal sclerites mahogany brown due to subcuta-

neous, mottled pigmentation, becoming darker caudad; membranous areas creamy white becoming gray-white caudad, intersomital bands on basal segments creamy white, others caudad becoming inconspicuous; paraprocts medium brown, cerci entirely dark brown. Body length 9.0 mm.

Habitat.—Colonies in bark crevices of low growth, dense, natural forest.

Records.—In addition to a small cultured series, my collection contains a damaged male (terminalia in good condition) from the same orchid interception as the holotype and closely conforms to its characters. The specimen cited by me (1944:442) from Medellín, Colombia, probably isn't *S. grandis*.

Schizembia bryophila Ross
new species

(FIGURE 40 A, C, D)

Holotype.—Male, on slide, CAS. Data.—Venezuela: 3 km N of Rancho Grande, Aragua, a research station N of Maracay, about 750 m elev., matured in culture, 1-IV-75 (E. S. Ross).

Name basis.—Greek *bryo* (moss) *philo* (love), in reference to the species preference for a mossy, road bank habitat.

Description.—Appearance: Rather large, slender, generally paler in coloration than *S. grandis* with body varied shades of tan and pale yellow, cranium chestnut brown with blackish eyes. Color details (in alcohol): Cranium mottled chestnut brown; eyes globose, inflated, blackish lavender. Basal antennal segments medium brown, others to apex (segment 22) pale yellow tan. Prothoracic and cervical sclerites pale yellow, membranous areas creamy white. Pterothoracic sclerites pale tan with piceous sutures, membranous areas creamy white; all legs pale tan, forecoxae yellow. Venal bands of wings pale tan; hyaline stripes narrow, sharply defined; RBS borders and costal margin almost white. Abdomen basically pale tan but tergites are darkened by a subcutaneous medium brown tinge; tenth tergite and basal segment of left cercus glossy yellow tan; cerci, including joints, pale tan. Dimensions (on slide): Body length 8.5 mm; forewing length 6.8 mm, breadth 1.75 mm.

Important anatomical characters.—As figured. Especially important is the narrow cranium with large, bulging eyes separated by an interspace a little more than one eye-width; the very narrow prothorax; the especially large, pale wings and illustrated terminalia details which include very small microspines on the tergal processes; a shorter more tapered process beneath 10 RP, and a more robust, gradually lobed LC_1.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Cranium dull mahogany brown, without pattern; antennae similar to holotype's in color. Prothorax and acrotergite 1 golden tan, membranous areas creamy white. Mesothoracic sclerites concolorous with cranium, caudal angles of mesonotum yellow tan; pleural membranous areas pale purple; acrotergite 2 and prescutum pale amber, adjacent membranous areas dull creamy white, thus forming a broad intersomital band. Metanotum dull chestnut brown blending on all margins to amber yellow; pleurites dark mahogany brown, surrounding membranous areas dull creamy white. Leg segments mahogany brown except for creamy white bases of foretibia of all legs. Abdominal sclerites mahogany brown, darker on caudal somites and paragenital sternites; paraprocts tan; all membranous areas whitish, forming transverse, intersomital bands ("annulations") on abdomen when distended; cerci, including joints, medium brown. Body length 10.0 mm.

Paratypes and parallotypes.—A very large series of both sexes reared in holotype's culture. Deposited in CAS, USNM, BMNH, Instituto de Zoologia, Maracay, Venezuela, and other appropriate museums.

Habitat.—High, damp rainforest immediately north of crest of pass near Rancho Grande. Colonies abundant in dense moss and other growths on rocky road banks. Rock crevices used as retreats. They probably also occur on tree trunks and other substrates. Cultures produced hundreds of adult specimens during many months of a year.

Schizembia bryophila is very closely related to *S. grandis* but occurs at a much lower altitude in a more lush high-growth rain forest. As illustrated (Fig. 40A), its cranium has a narrower, less oval, more straight-sided form with much larger eyes. There are also minor differences in terminalia structures. Future sampling and study may reveal, however, that the two populations are races of a single species.

Schizembia callani Ross

(FIGURE 41)

Schizembia callani Ross, 1944:444, figs. 73–75.—Szumik, 1996:52 (discussion).

Holotype.—Male, on slide, BMNH. Data.—Trinidad: St. Augustine, 4-VI-39 (E. McCallan), at light.

Discussion.—It is now apparent that the holotype is an aberrant specimen, one in which the left or right side of the tenth tergite and their processes are repeated and terminally fused. A normal, nearly topotypic male, one of a large cultured series, is designated plesiotype and described below.

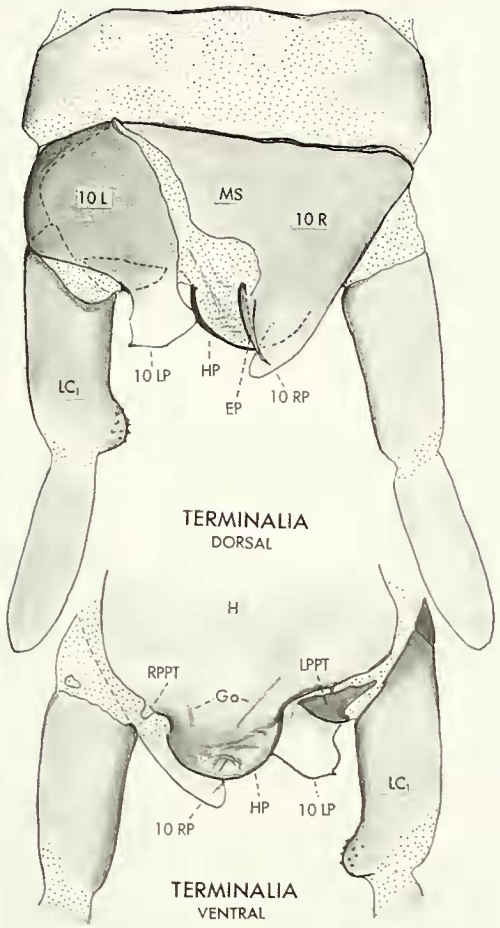

FIGURE 41. *Schizembia callani* Ross, new species, plesiotype. Type locality: Trinidad: St. Augustine.

Plesiotype—Male, on slide, CAS. Data.—Trinidad: Grounds of Hilton Hotel, Port of Spain, matured in culture 13-VII-64 (E. S. Ross).

Description.—Appearance: Rather small; strongly bicolorous, prothorax pale yellow, body dark brown, head and terminalia much darker. Cranium rather circular, evenly very dark mahogany brown; eyes large, interspace two eye-widths. Antennae 17-segmented (complete), uniformly tan except for two darker brown basal segments. Mandibles small, very acutely pointed, without flanges. Prothorax and cervical sclerites pale amber yellow. Pterothorax and legs dark brown except for pale tibial bases and yellowish fore coxae. Wings with RBS borders meeting costa in apical half of wing, MA and RP well pigmented tan; no cross-veins except for a faint one subapically between RBS and RP. Terminalia as figured, similar to *S. bryophila,* but differing in shorter proportions; narrowly tapered, distally-rounded 10 RP with a stronger and more diagonally developed inner carina which terminates in a tiny point (probably a homolog of the "talon" present in most chelicerines). Hypandrium process (HP) very broad with conspicuous transverse rugosity. Gonapophyses very small slender, scarcely visible. Dimensions (on slide): Body length 6.5 mm; forewing length 4.5 mm, breadth 1.3 mm.

Neallotype.—Female, in alcohol, CAS. Data.—Reared in plesiotype's culture.

Description.—Cranium dull, dark, chestnut brown with faint vertex pattern. Eyes black. Basal antennal segment golden brown; all other segments (15) pale yellow. Prothoracic and cervical sclerites golden yellow, associated membranous areas dark creamy white. Meso- and metathoracic sclerites, including intersomital, dull dark mahogany brown. Fore coxae and trochanters golden yellow, forelegs otherwise dark chestnut brown. Other legs chestnut brown except for creamy white femorotibial joints and paler tarsi. Abdominal sclerites chestnut brown, membranous areas pale tan, sterna 8 and 9 darker brown, paraprocts medium brown. Cerci entirely pale tan. Body length 9.0 mm.

Note.—Specimens of both sexes will be deposited in CAS, USNM, BMNH and Inst. Zool., Maracay, Venezuela.

Schizembia guanare Ross
new species
(FIGURE 42)

Holotype.—Male, on slide, CAS. Data.—Venezuela: Guanare, Portuguesa, matured in culture 5-XII-58 (B. Malkin). In bark of log.

Name basis.—The name of the type locality.

Description.—Appearance: Rather small, almost identical to *S. callani* of Trinidad with similar coloration and wings but with distinct terminalia, as follows: 10 LP slightly rugose, more transverse, not extensively pale amber yellow and, most important, two large points on its short outer margin; 10 RP apex smaller with a larger micro-spine at caudal end of inner carina; HP with a larger, transverse wrinkle; LC_1 extensively tubular with an abrupt, small, inner-apical lobe. Dimensions (on slide): body length 6.2 mm; forewing length 4.9 mm, breadth 1.3 mm.

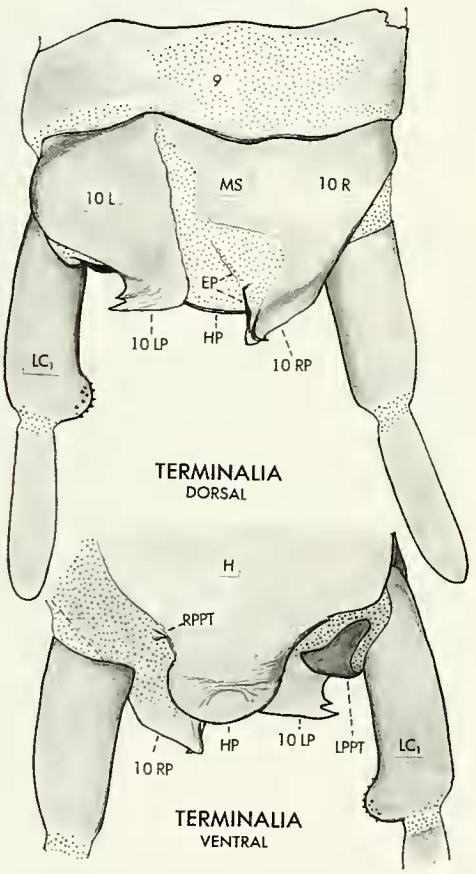

FIGURE 42. *Schizembia guanare* Ross, new species, holotype. Type locality: Venezuela: Guanare, Portuguesa.

Allotype.—Female in alcohol, CAS. Data.—Reared in holotype's culture.

Description.—Cranium dull chestnut brown; antennae entirely pale yellow, 18-segmented (complete). Prothoracic and cervical sclerites pale yellow, slightly tinged with tan, associated membranous areas creamy white. Remainder of sclerotic areas of body mahogany brown, membranous areas creamy white. All legs varied shades of mahogany brown except for dull yellowish fore coxae and trochanters and creamy white mid- and hind leg femorotibial joints and mid- and hind tarsi. Paraprocts and cerci basically pale yellow, tinged with tan. Body length 8.5 mm.

Paratypes and parallotypes.—Numerous males and females from holotype's culture deposited in CAS, USNM, and Inst. Zool., Maracay, Venezuela.

Schizembia colombiana Ross
new species
(FIGURE 43)

Holotype.—Male, on slide, CAS. Data.—Colombia: 2 mi W of Calarca, 1500 m elev., Caldas, I-XII-55 (E. S. Ross).

Description.—Small; varied shades of tan and dark brown with cranium and terminalia darkest, pterothorax lighter mahogany brown, pronotum tan with prothorax contrastingly pale due to adjacent creamy white membranous areas, abdomen with pleural membranes also creamy white. Antennae entirely medium brown, 18-segmented (complete). Hemitergites 10 L and 10 R glossy chestnut brown, including processes; cleft creamy white. Basal cercus segments chestnut brown grading distad to creamy white. Dimensions (on slide): Body length 7.3 mm; forewing length 5.0 mm, breadth 1.3 mm.

Important anatomical characters.—Cranium elongate, sides straight, caudally convergent; eyes small, interspace about four eye-widths; mandibles small, acutely pointed, without flanges, outer angles not acutely produced. Wings with RBS contacting C in apical half, borders very dark purple; five crossveins between RBS and RP in forewing. Terminalia as figured; 10 LP slanted ventrad with a relatively

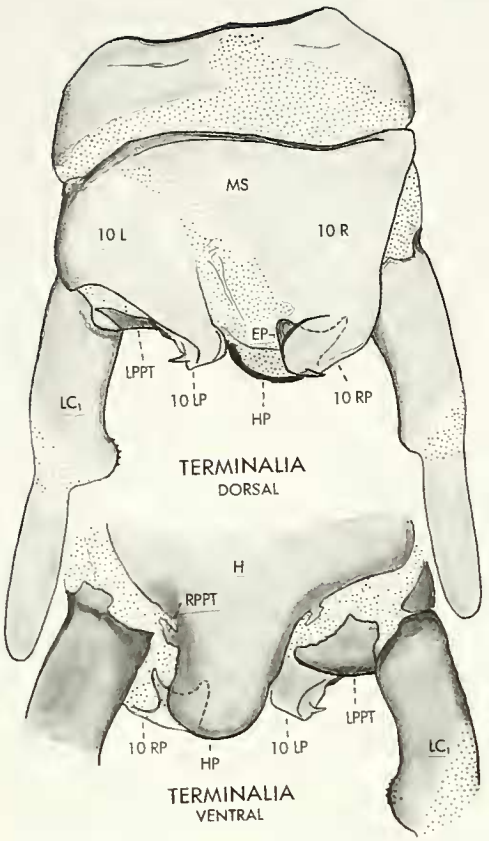

FIGURE 43. *Schizembia colombiana* Ross, holotype. Type locality: Colombia: 2 mi W of Calarca, Caldas.

large medial talon; 10 RP with a prominent, inner-apical carina arced caudo laterad, ventral process large, triangulate, talon of caudal angle relatively large; HP narrow, laterad and caudal margins strongly sclerotic, black; LPPT sclerite exceptionally large.

Allotype.—Female, in alcohol, CAS. Data.—Reared in holotype's culture.

Description.—Coloration paralleling that of males, differing as follows: cranium chestnut brown with faint pattern, antennae creamy white, pronotum and acrotergite 1 pale yellow, forelegs mostly yellowish tan, caudal angles of mesonotum grading to yellowish tan. Abdominal sternite 8 dark brown in lateral fourths, light brown medially; ninth sternite largely medium brown, adjacent membranous areas, and paraprocts creamy white; cerci tan with creamy white joints and tips of distal segments. Body length 8.0 mm.

Paratypes and parallotypes.—Numerous males and females from holotype's culture, deposited in CAS, USNM, IHNB, NMQ, and other appropriate museums.

Additional record.—Colombia: 7 mi W Alban, Cundin Amarca, 1610 m elev., series matured in culture VI-55 (E. S. Ross).

Habitat.—Under and in bark of trees and fence posts in coffee plantations. Adults matured in culture between September and March, mostly during December–January.

HIRSUTA GROUP

Composed of a single, weakly sclerotized species with typical *Schizembia* characters except for the peculiar right tergal process (10 RP) having a finely hirsute inner edge, a lack of a longitudinal carina, and only a minute barb on its outer corner.

Schizembia hirsuta Ross

new species

(FIGURE 44)

Holotype.—Male, on slide, CAS. Data.—Trinidad: 5 mi N Arima, 700 ft elev., matured in culture 3-VI-64 (E. S. Ross).

Description.—Cranium dark brown, body and appendages entirely pale tan. Eyes very large, interspace one eye-width. Mandibles narrowly acute, without flanges. Antennae uniformly tan, 19-segmented (complete). Wings with RBS almost completely slanted into costa; two very faint cross-veins between RBS and RP. Prothorax paler than pterothorax; all legs uniformly pale tan. Terminalia as figured; inner edge of 10 RP non-sclerotic, bearing fine setae, lacking carina, outer right corner with a tiny barb. Gonapophysis sclerotization absent. Dimensions (on slide): body length 7.1 mm; forewing length 5.5 mm, breadth 1.4 mm.

Allotype.—Female, on slide, CAS. Data.—Reared in holotype's culture.

Description.—Pale translucent yellow except for strongly contrasting, dull mahogany brown cranium, rust brown tinges on anterior corners of meso- and metathoracic somites and similar tinges on abdominal tergites and pleura. Cerci creamy white. Body length 7.0 mm.

Paratypes and parallotypes.—Numerous males and females from type culture deposited in CAS, USNM, BMNH, and other major museums.

Discussion.—This species is readily recognized by its pale coloration. The hirsute inner margin of 10 RP with an exceptionally minute talon on its right hind angle are additional distinguishing features.

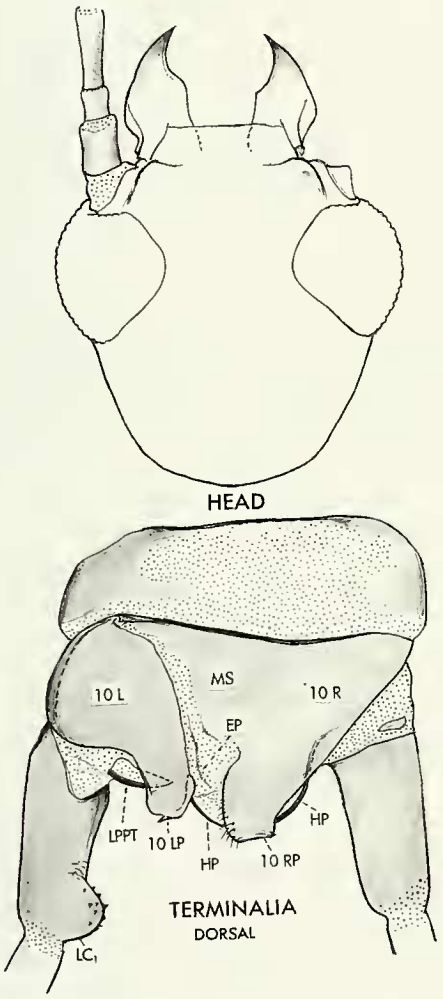

FIGURE 44. *Schizembia hirsuta* Ross, holotype. Type locality: Trinidad: 5 mi N Arima.

Genus *Chelicerca* Ross

Anisembia (*Chelicerca*) Ross, 1940b:656.

Chelicerca Ross, 1944:448 (generic status); 1984b:30; 1984c:128.—Szumik, 1996:51.

Chelicerca (*Protochelicerca*) Ross, 1944:449 (Type species: *C. dampfi* Ross, 1944). New synonomy.

Type species.—*Anisembia* (*Chelicerca*) *davisi* Ross, 1940b:656, by original designation.

Distribution.—Mexico, southward into northern Argentina and southern Peru. Absent in West Indies.

Diagnosis.—Males: Usually small, body length averaging 8–9 mm; apterous or alate. Usually darkly pigmented, often with a reddish prothorax. Head small, quadrate, weakly sclerotized. Wings, if present, narrow; RBS often slanted into costal margin before wing apex; cross-veins poorly developed, present only between RBS and RP, or absent. Abdominal terminalia highly diverse; tenth tergite always cleft to its basal margin. Left process (10 LP) usually broad to apex, usually folded downward on left side, often carinate, notched, or with a small subprocess on caudal margin. Right hemitergite (10 R) often deeply emarginated on inner side; its process (10 RP) typically with a slender talon arcing across or behind its apex, or located on outer-apical corner. Epiproct (EP) varying from a clear membranous fold, or becoming sclerotic as a result of fusion of microspicules. Ejaculatory duct usually bordered by dark, rod-like sclerotic gonapophyses (GO). Hypandrium lobe (HP) very broad, caudal margin often complex with one or more smaller lobes, some bearing minute echinulations. Left paraproct (LPPT) a triangular sclerotic plate completely detached from adjacent structures; right paraproct obsolete, or a fragment fused to H. Basal segment of left cercus elongate, always echinulate on a usually-abrupt lobe; in many species the apical segment is partially to completely absorbed into the basal segment. Basal segment of right cercus with at least outer edge of basal rim sclerotic, usually entirely so with an irregularly shaped flange; apical segment always distinctly articulated.

Females.—Without good generic characters, but females of some species recognizable by a multicolored, banded pattern on body somites. Others, however, are uniformly black or tan.

Discussion.—*Chelicerca* is perhaps the most diversified genus of the order, especially so in arid or semi-arid regions—particularly in Mexico. Species of the genus and its close relative, *Dactylocerca* Ross, have adapted to marginal environments south-

ward from cold extremes of central Mexico to hot deserts and tropical forests. Some species occur above 4000 m in Ecuador's Andes and one, depending on fog moisture, thrives amongst lichens in the almost rainless coastal deserts of Peru.

Since my last revision (1944), I have collected at least seventy-five new species throughout the Americas. These can be placed in several Species-Groups, the most distinct of which may eventually be regarded as genera or subgenera. Usually only one component species of each will be described at this time.

For the user's convenience, I have separately treated species occurring in Mexico, Mesoamerica and South America. Except in southern Mexico and northern Guatemala, these faunas appear to be distinct.

KEY TO SPECIES–GROUPS OF MEXICAN *CHELICERCA*

(Adult males)

1. Caudal margin of HP without projections..... 2
— HP margin, with projections 3
2. Left mandible without a medial flange. Epiproct (EP) not sclerotic. 10 LP narrow, outer side abruptly folded ventrad. Left cercus two-segmented ..... *Dampfi* Group
— Left mandible with a medial flange. Epiproct a sclerotic arc. 10 LP exceptionally broad, folded ventrad only at extreme, outer edge. Left cercus one-segmented. .....*Jaliscoa* Group
3. Antennal segments short, keg-like, globose, their sides curved..... *Maxima* Group
— Antennal segments elongate, slender, their sides straight, flared distad 4
4. Left mandible without an acute medial flange 5
— Left mandible with an acute medial flange ....*Wheeleri* Group
5. Caudal margin of HP with two blunt lobes, one on each corner .....*Nodulosa* Group
— Caudal margin of HP with a large, extremely slender, sharp, sclerotic, abruptly left-directed spine ..... *Spinosa* Group

DAMPFI GROUP

Males small, alate. Mandibles short, apices sharp; left mandible without a medial flange. Eyes very large. Cleft of terminalia without sclerites; 10 LP folded ventrad, lacking apical hook; inner-apex of 10 RP evenly arcuated, terminated by a short talon on outer apex. Caudal margin of HP unlobed, weakly sclerotized, right edge microspiculate. Gonapophyses weakly sclerotized. Left cercus 2-segmented.

This group includes only the following species.

Chelicerca dampfi Ross

(FIGURE 45)

Chelicerca (*Protochelicerca*) *dampfi* Ross, 1944:450, figs. 83, 85, 86; 1984:31.—Szumik, 1996:51 (cladistics).

Holotype.—Male, on slide, USNM. Data.—Mexico: Finca Esperanza, Chiapas, at light in a coffee plantation in virgin forest, 3-VIII-35 (A. Dampf).

Paratypes.—Two males, on slides, CAS; with above data.

New record.—Chiapas: 19 mi NE Huixtla, 900 m elev., in coffee plantation in thinned, humid, virgin forest (E. S. Ross). This series, probably topotypic, matured in the culture between September and January. Specimens will be deposited in UNAM.

WHEELERI GROUP

Adult males extensively varied in size and appearance, entirely black to pale amber yellow, apterous or alate (both morphs in *C. wheeleri*). Cranium often elongate; mandibles usually elongate, always with an acute medial flange on left mandible. Wings with RBS abruptly terminated, not slanted into costa; longitudinal veins not cuticularized, cross-veins absent, hyaline stripes narrow, sharply defined. Hind basitarsi stout, plantar setae very dense. Cleft of terminalia lacking sclerites except for the caudal edge of epiproct (EP). 10 LP very broad with an acute hook on inner or outer caudal corner. 10 RP narrow, talon arising on its inner side and arcing across apex of process. Gonapophysis "rods" (GO) dark, sclerotic. HP broad, sclerotic, turned dorsad, bearing submedially a conical or an apically-rounded, nonspiculate process. LPPT large, dark, not fused to any structure. Basal segments of cerci robust, sclerotic; the left (LC_1) with a broadly rounded, finely echinu-

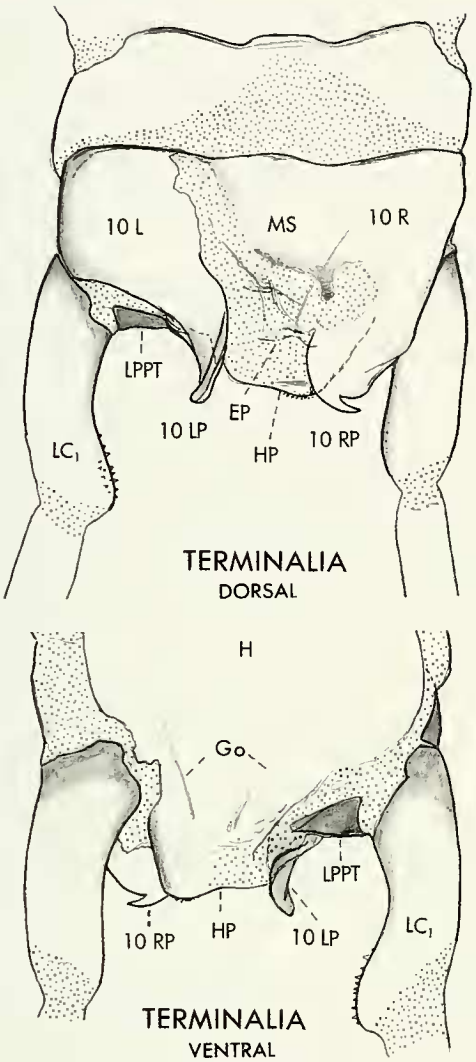

FIGURE 45. *Chelicerca dampfi* Ross. Terminalia of a male from Mexico: 19 mi NE of Huintla, Chiapas.

late, inner lobe; distal segment (LC_2) broadly fused to LC_1.

Females.—Variable in coloration.

Distribution.—Highlands of west-central Mexico, especially under stones in semi-arid habitats.

Discussion.—During several trips to Mexico, I collected and cultured many new species. Because of the extent of my treatment of the entire order, I am offering only brief descriptions and only a few illustrations of new species of this Group. However, my precisely-cited type localities can be visited by resident, future researchers wishing to secure topotypic specimens.

KEY TO ADULT MALES OF *WHEELERI* GROUP

1. Foretarsi white ..... *albitarsa*
— Foretarsi varied shades of tan or brown 2
2. Inner caudal margin of 10 RP extended mesad, terminated by a translucent, blade-like extension; talon small, slender, slanted caudolaterad across rounded apex of 10 RP ..... *amatitlana*
— Inner caudal margin of 10 RP not extended mesad, instead it is evenly arcuated caudolaterad as the caudal margin of an evenly-arcuate talon 3
3. Interstices of eye-facets darkly pigmented ... 4
— Interstices of eye-facets unpigmented 5
4. Body entirely blackish, apterous ..... *tantilla*
— Abdomen, except terminalia reddish or yellowish; body, head and appendages otherwise blackish; winged ..... *semirubra*
5. Cranium blackish brown; body entirely, or almost entirely, blackish 6
— Cranium golden yellow, body almost entirely yellowish 8
6. Mandibles short, broad, due to short molar area 7
— Mandibles elongate due to lengthening of molar area, which is incurved ..... *guerreroa*
7. Very small (body length 5 mm); winged, RCB contacting C before distal third of wing .. *trica*
— Moderately large (body length exceeding 8 mm); usually apterous; if winged, RCB never contacts C ..... *wheeleri*
8. Distinctly bicolorous, head and forebody golden yellow, or yellowish, otherwise shades of brown ..... *semilutea*
— Almost entirely yellow ..... *lutea*

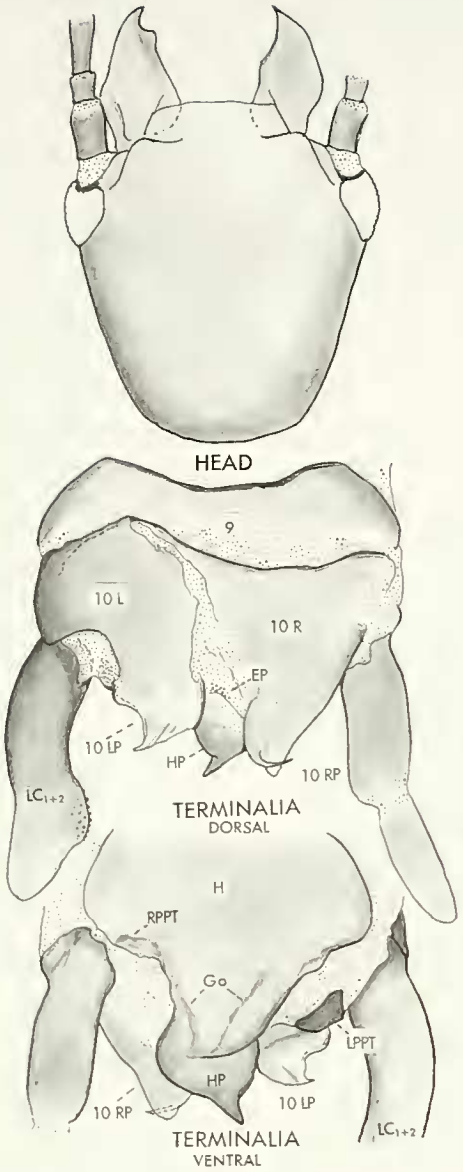

FIGURE 46. *Chelicerca wheeleri* (Melander). Head and terminalia of a male from Mexico: near Cuernavaca, Morelos.

Chelicerca wheeleri (Melander)

(FIGURE 46)

Olyntha wheeleri Melander, 1902:17, fig. 1.

Anisembia wheeleri (Melander), Krauss, 1911:70.—Chamberlin, 1923:346.—Davis, 1940:532.

Haploembia wheeleri (Melander), Enderlein, 1912:70, 109.

Anisembia (*Chelicerca*) *wheeleri* (Melander), Ross, 1940b:657, figs. 29, 30.

Chelicerca (*Chelicerca*) *wheeleri* (Melander), Ross, 1944:452, figs. 89–91.

Chelicerca wheeleri (Melander), Ross, 1984:37.—Szumik, 1996:51 (cladistics).

Holotype.—Apterous male, on slide, MCZ. Data.—Mexico, Cuernavaca 27-XII-1900 (W. M. Wheeler).

Discussion.—Until my 1946 collecting, this species was known only from its holotype. I have since cultured large, nearly topotypic, series of both sexes. An occasional winged individual develops in a single culture. The species commonly occurs under stones in semi-arid habitats. Records: Guerrero: 5 and 12 mi S Cuernavaca; 5 mi S Ticuman, 900 m elev.; Morelos: 4 mi W Yautepec, 3700 ft elev. This series has a higher percentage of alate individuals. All lots collected by E. S. Ross.

Chelicerca wheeleri is the largest species of its group and is recognized by its almost uniformly black, coloration and very short, broad mandibles.

Chelicerca guerreroa Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Guerrero: 7 mi W Teloloapan, 5000 ft elev., matured in culture 18-I-79 (E. S. Ross).

Description.—Entirely black, smaller than *C. wheeleri* (body length 7.5 mm), apterous. Cranium elongate. Antennae 17-segmented (complete). Mandibles elongate due to extensive, incurved molar area. Terminalia similar to *C. wheeleri,* differing as follows: 10 RP longer extending well beyond crossing of talon; talon stout, almost straight (that of *C. wheeleri* is slender and evenly arcuate); medial lobe of HP bluntly rounded (that of *C. wheeleri* is conical, sharply pointed); LC_1 abruptly lobed (that of *C. wheeleri* is gradually lobed).

Paratypes.—Numerous males from type culture deposited in CAS, USNM and UNAM.

Habitat.—Under stones in grassy pasture amidst scattered native, xeric vegetation.

Discussion.—This species differs from *C. wheeleri* in numerous other details. It is one of a complex of species or subspecies which will require detailed study based on many cultured series.

The following records elements of this complex I have cultured. Guerrero: Mazatlan, 1250 m elev, stop 36; hwy. 95, stones and hilly pasture; 10 mi NE Taxco, 4400 ft elev.; 3 mi N Chilpancingo (males at this locality are much smaller than topotypes and probably represent a distinct species).

Chelicerca albitarsa Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Oaxaca: 35 mi NW Nochixtlan (C-26), matured in culture 13-XII-48 (E. S. Ross). Colony under stone in limestone region with *Taxodium*, pepper trees and cacti, but no oaks.

Description.—Entirely black except for conspicuously white basitarsi of forelegs and pale membranous areas between sclerites, especially between abdominal terga, creating an annulate appearance. Apterous. Body length 7.34 mm. Cranium circular. Antennae 17-segmented (complete). Mandibles very short, due to short molar area. Medial flange of left mandible very broad and close to mandible's apex. Terminalia with 10 LP spine exceptionally large, very narrowly acute; medial lobe of HP very small, parallel-sided, distally rounded.

Paratypes.—Numerous males from type cultures deposited in CAS, USNM and UNAM.

Additional record.—Oaxaca: 9 mi S Nochixtlan, 7000 ft elev, large series cultured during 1976 (E. S. Ross).

Discussion.—This is the only species of the order with white basitarsi of forelegs. Males are exceptionally large. The broad, rounded cranium indicates a high degree of neoteny.

Chelicerca amatitlana Ross

new species

(FIGURE 47)

Holotype.—Male, on slide, CAS. Data.—Mexico: Puebla: 9 mi N Amatitlán (C-21), under stone, matured in culture 10-XII-48 (E. S. Ross).

Description.—Entirely black, smaller than *C. wheeleri* (body length 7.25 mm), apterous. Cranium elongate. Antennae 16-segmented (complete). Mandibles elongate, molar area lengthened but not incurved. Terminalia similar to *C. wheeleri* but differing in details of tenth tergal processes, 10 LP with narrow projection above its narrowly-acute talon; 10 RP with a meso-caudal, transparent projection mesad of its rather straight narrow talon.

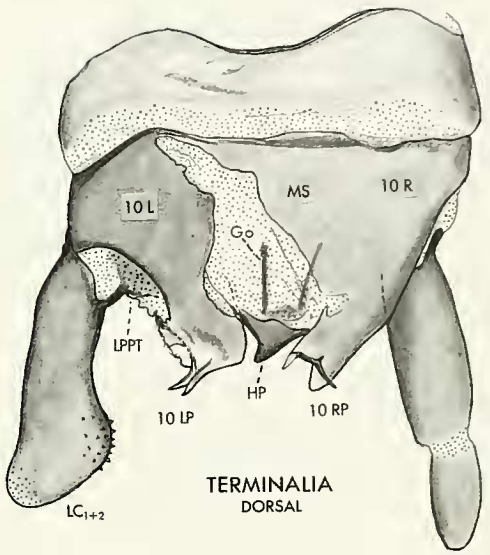

FIGURE 47. *Chelicerca amatitlana* Ross, new species, holotype. Type locality: Mexico: 9 mi N of Amatitlan, Puebla.

Paratypes.—Numerous males from type culture deposited in CAS, USNM and UNAM.

Discussion.—This is the only *Chelicerca* with two double projections on each tenth tergal process, otherwise it isn't particularly distinct. The type culture was collected under stones in a canyon with low tropical xerophytic flora.

Chelicerca tantilla Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Puebla-Oaxaca border on Pan-American Highway, C-28, under stone, matured in culture X-49 (E. S. Ross).

Name basis.—Latin *tantillus* = so little, in reference to the exceptionally small size of the species.

Description.—Entirely black; apterous, slender perhaps the smallest *Chelicerca* (body length 6.0 mm). Cranium oval. Antennae 15-segmented, segments 3 to 15 light brown. Eyes very small, facet interstices pigmented. Mandibles rather short mostly blackish, medial flange of left mandible very close to apical point. Terminalia without noteworthy distinctions.

Paratypes.—Numerous males from holotype's culture deposited in CAS, USNM and UNAM.

Discussion.—The small size of this species with pigmented facet interstices aids recognition of this species. It seems to have widespread occurrence, as indicated by the following records: Puebla: 15 mi S Petlacingo, 5750 ft elev, palmetto-oak zone. Mexico: 10 mi S Ixtapan; La Finca, 11 mi S Tenancingo, 6000 ft elev. Morelos: 5 mi S Puerto de Ixtla, 2600 ft elev. Guerrero: 8 mi S Michapa, stone in pasture. All collected by E. S. Ross.

It is possible that future detailed study will reveal that the above series represents a few distinct species or subspecies. The type locality is grassland with oaks and small palms with scattered limestone rocks under which the culture was secured.

Chelicerca semirubra Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Puebla: 15 mi S Rijo, 4600 ft elev., matured in culture, II-77 (E. S. Ross).

Description.—Small (body length 6.5 mm), winged; blackish brown except for reddish abdomen (excluding brown terminalia). Cranium elongate oval, very dark. Antennae 16-segmented (complete), segments 3–16 light brown. Eyes very small, facet interstices dark brown. Mandibles moderately long, blackish brown except for dark amber dental surfaces. Wings with RBS merging with C at distal third of wing (the Oaxaca series are apterous). Terminalia not distinctive except for the irregular left margin of 10 LP with a hook-like, acute talon.

Paratypes.—Numerous males from type cultures deposited in CAS, USNM and UNAM.

Additional records.—Puebla: 7 mi S Amayuca, 3800 ft elev. (E. S. Ross); Nicolás Bravo, 11.5 km E Azumbilla, 2600 m elev. (V. Lee); 8 mi S Izúcar de Matamoros, under stones (E. S. Ross). Oaxaca: near Mitla, 5000 ft elev. (E. S. Ross); Yagul (ruins), 1600 m elev (E. S. Ross).

Discussion.—The Mitla and Yazul males are apterous. Males of a series from 40 mi NW Nochixtlan, Oaxaca (C-27) are very small (body length 5 mm), winged, and may prove to be *C. semirubra* but they have a pale yellow, instead of red, abdomen. They also have a broader medial flange on the left mandible and a broad HP nodule (parallel-sided in typical *C. semirubra*). These specimens may represent a distinct species, or a subspecies.

Chelicerca trica Ross

new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Puebla: 8 mi S Izúcar de Matamoros, matured in culture 10-XII-48 (E. S. Ross).

Name basis.—Latin *trica* = trifle, in reference to small size of individuals of the species.

Description.—Small (body length 5.0 mm), winged, blackish brown throughout. Cranium oval, dark chocolate brown. Antennae uniformly dark brown. Mandibles short, golden on dental surfaces; medial flange of left mandible acute, very close to mandibular apex. Eyes very small, facet interstices clear. Wings small, RBS short, merging with C just beyond mid-wing. Caudal plantar setae of basitarsi long and slender. Terminalia characters not particularly distinctive, epiproct sclerite (EP) unusually broad, HP's caudal process thumb-like, apex rounded

Habitat.—Under stones on semi-arid hilltops.

Paratypes.—None.

Chelicerca lutea Ross

new species

(FRONTISPIECE and FIGURE 48)

Holotype.—Male, on slide, CAS. Data.—Mexico: Guerrero: 5 mi S Ticuman, 900 m elev., matured in culture I-82 (E. S. Ross).

Name basis.—Latin *luteus* = yellow, in reference to yellowish color of specimens.

Description.—Small (body length 6.5 mm), slender, apterous. Cranium amber yellow, basal segment of antenna and basal two-thirds of mandibles yellow, apices reddish brown; flagellar antennal segments and apices of palpi blackish brown; antennae 18-segmented (complete). Body, including tenth abdominal tergite, pale yellow. Legs varied shades of yellow, mid- and hind legs medium brown. Terminalia as figured, talon of 10 RP long, slender, sickle shaped, not extended above apex of process. LPPT and borders of HP dark brown, cerci blackish brown.

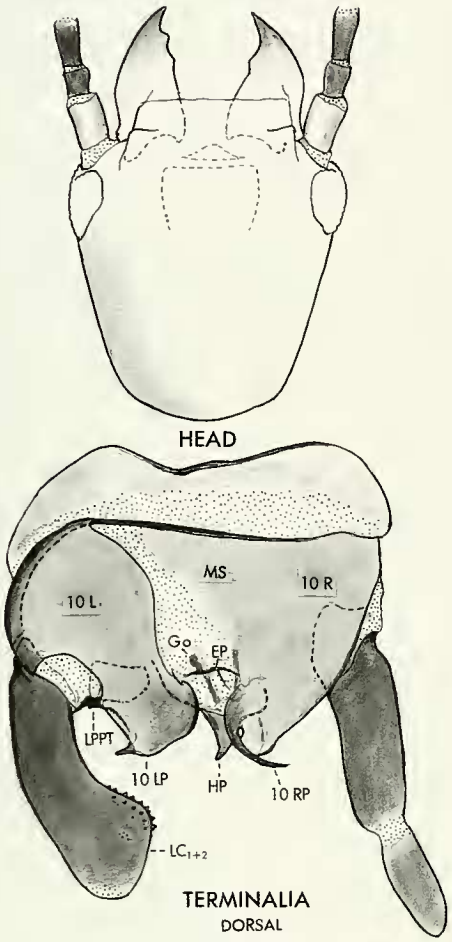

FIGURE 48. *Chelicerca lutea* Ross, new species, holotype. Type locality: Mexico: 5 mi S of Ticuman, Guerrero.

Paratypes.—Numerous males from holotype's culture, deposited in CAS, USNM and UNAM.

Additional records.—Mexico: Ixtapan de la Sal, 6000 ft elev. Guerrero: 5 mi S Cuernavaca; 45 mi SE Cuernavaca (5 mi N of Palacingo). Morelos: Ahuehatzingo, 3200 ft elev. All collected and cultured by E. S. Ross.

Discussion.—Terminalia characters in this series closely match those of holotype. The species occurs under stones in the same localities and habitat of *C. wheeleri*, adults of which, being entirely black and larger, therefore readily distinguished.

Chelicerca semilutea Ross
new species

Holotype.—Male, on slide, CAS. Data.—Mexico: Morelos: Huajintlán, matured in culture 15-IX-46 (E. S. Ross).

Description.—Appearance distinctive, the forebody shades of orange and yellow, the hind portion (the abdomen and hind legs) dark brown. Apterous, relatively large (body length 9.0 mm). Cranium long; eyes small, facet margins clear. Antennae medium brown, 18-segmented (complete). Mandibles exceptionally long and apically tapered; medial flange very slightly projected, broadly obtuse. Terminalia closely resembling that of *C. wheeleri*, but overall paler in color; caudal process of HP short, apically rounded instead of acutely pointed, as in *C. wheeleri*.

Paratypes.—Numerous males from holotype's culture deposited in CAS, USNM and UNAM.

Additional record.—Guerrero: El Naranjo (6 mi NW of Iguala), 2700 ft elev. (E. S. Ross). Under stones in arid pasture.

NODULOSA GROUP

Left mandible lacking a prominent medial flange, usually smoothly inwardly arcuate. Mandibles never elongate; always alate. Hind basitarsus slender, setae relatively sparse. 10 LP abruptly folded ventrad, lacking a talon. Talon of 10 RP originating on inner caudal margin. Epiproct (EP) sclerotic. Caudal margin of HP bilobed, left lobe either microechinulate or smooth. Gonapophysis "rods" (GO) present, often sclerotic. Left cercus segments fused, inner side straight, not abruptly lobed; outer-apical side longitudinally, diagonally membranous.

Discussion.—This group comprises two sections, one represented by *C. davisi* (Ross) was treated by me (Ross, 1984:31) as a separate Species-Group, one having the left lobe of HP conical and smooth. The other, represented by *C. nodulosa* Ross, has both lobes microechinulate, the left being nodulose, thumb-like.

Two male specimens (CAS) with incomplete data are labelled "Guatemala".

The first section comprises three described species and several difficult-to-define, usually pale, western Mexican new species. The named species are:

Chelicerca davisi (Ross)

(FIGURE 49)

Anisembia (*Chelicerca*) *davisi* Ross, 1940b:656, figs 26-28.

Chelicerca davisi (Ross), Ross, 1944:451; 1984b:31.—Szumik, 1998:3.

Holotype.—Male, on slide, USNM. Data.—Vera Cruz: Intercepted in plant quarantine, probably in a shipment of gardenias from El Fortin.

Additional records.—Vera Cruz: Metlac Canyon, El Fortin (E. S. Ross). Vera Cruz: 2 km E Catemaco, 350 m elev. (E. S. Ross). Males from this locality are very small, only half the size of those from Metlac Canyon. Colonies occur in bark crevices of trees in humid, lowland tropical forest.

Chelicerca heymonsi (Enderlein)

Oligotoma heymonsi Enderlein, 1912:114.

Anisembia (?) *heymonsi* (Enderlein), Chamberlin, 1923:346.

Anisembia heymonsi (Enderlein), Davis, 1940:582.

Anisembia (*Chelicerca*) *heymonsi* (Enderlein), Ross, 1940b:658.

Chelicerca (*Chelicerca*) *heymonsi* (Enderlein), Ross, 1944:454; 1984:32.

Type.—Male, on slide, Berliner Zoologischen Museum. Data.—"Mexico Sierra Mixteca CA Purpus SV" "170" "Oligotoma Heymonsi Enderl. ♂ Type Dr. Enderlein det 1911."

Discussion.—The type specimen is incomplete—

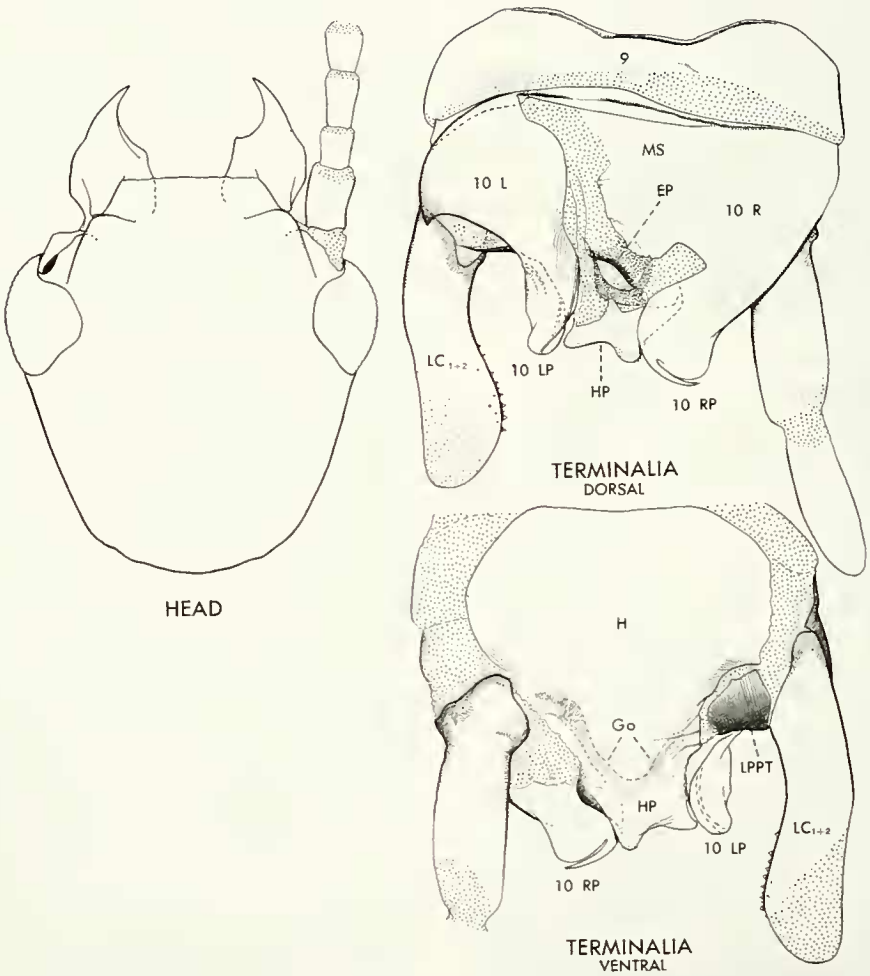

FIGURE 49. *Chelicerca davisi* (Ross). Head and terminalia of a male from Mexico: Metlac Canyon, Vera Cruz.

only the head, prothorax and legs, mesothorax, one pair of wings and the terminalia (on slide). Unfortunately, coverslip pressure of Enderlein's slide caused considerable damage to the terminalia. While the slide was on loan, I made a new preparation with a supported coverslip and the following description:

Appearance.—Small, alate, head and body piceous except for a contrasting golden yellow prothorax and pale flagellar antennal segments. Color details (dry, on pin).—Cranium piceous throughout, surface finely and evenly reticulate; eyes and basal antennal segment piceous, other segments pale tan, becoming slightly darker distad. Pronotum golden yellow, faintly clouded medially with rust brown; prosternum dark mahogany brown. Cervical membranes straw yellow, cervical sclerites amber yellow. Forelegs and mesothorax entirely dark mahogany brown, almost as dark as cranium. Abdominal terminalia piceous. Dimensions (on slide).—length (apex of labrum to that of mesoscutum) 2.2 mm; forewing length 4.5 mm, breadth 1.1 mm.

Important anatomical characters.—Terminalia almost identical to those of my specimens from near Nochixtlan.

Discussion.—The type locality, "Sierra Mixteca," isn't precise but I assume that the series I collected near Nochixtlan is almost topotypic with data, as follows: Oaxaca: 12 mi SE Nochixtlan, 11-XII-48 (E. S. Ross), colony in oak bark crevices. I also collected specimens 9 mi S of Nochixtlan at 7000 ft elev. *Chelicerca albitarsa* n. sp., occurred in the same habitat.

My figures of the terminalia of *C. davisi* will serve to illustrate those of *C. heymonsi.* In spite of general similarity, *C. heymonsi* differs from *C. davisi* as follows: The *C. heymonsi* locality is much higher in altitude in an oak zone, that of *C. davisi* is lowland rain forest. Antennal segments of *C. heymonsi* are much shorter, globose, and brown; those of *C. davisi* are slender, flared and lemon yellow. The prothorax of *C. heymonsi* is yellow, that of *C. davisi* is dark brown.

Chelicerca chamelaensis Mariño and Márquez

Chelicerca (*C.*) *chamelaensis* Mariño and Márquez, 1982:102.

Holotype.—Male, UNAM. Data.—Jalisco: Chamela, 30-IV-76 (H. Brailovsky).

Discussion.—This is the first-named of a complex represented by several undescribed species I collected in western Mexico. One series is from Puerto de Mazos, Jalisco at 1550 m elev., under stones in oak zone. The body of all males is pale yellow and the head contrasting dark brown. Definition of these species will be difficult.

Chelicerca nodulosa Ross

Chelicerca (*Chelicerca*) *nodulosa* Ross, 1944:451; 1984:32.

Holotype.—Male, on slide, USNM. Data.—Vera Cruz: Collected in shipment of pineapples from Isla (small town E of Loma Bonita), 15-VI-40.

Discussion.—I have cultured several series from diverse localities in the states of Vera Cruz and Chiapas (at high altitude), but perhaps none are conspecific with the holotype of *C. nodulosa* which is very small (body length 5.5 mm) and has large eyes with an interspace less than an eye-width wide. Terminalia characters in the series are very similar but minor differences might justify describing a few new species. In common, they have relatively small eyes separated by 5 to 6 eye-widths, darker pigmentation, larger body size with large wings in specimens from high altitude in Chiapas.

I have collected and cultured series from the following localities: Vera Cruz: Metlac Cyn., near Fortin; 15 km NW Potrero; 5 mi E Las Vigas (in oak zone). Puebla: Nicolás Bravo, 11.5 km E Azubilia, 2600 m elev. (V. Lee). (A small species of the Wheeleri Group—*C. semirubra* n. sp. was also collected at this locality.) Michoacan: 2 km S Tuxpan, 5800 ft elev.; 14 km S Zitacuaro, 1650 m elev.; 3 km N Gabriel Zamora; 12 mi S Ario de Rosales, 3800 ft elev.; Oaxaca: Near La Cumbre (Hyw. 175), 2600 m elev.; Chiapas: Palenque, 200 ft elev.; Nachig, 7200 ft elev.; San Cristobal de las Casas, 7000 ft elev.; Lago de Montebello, 1400 m elev.; 3 mi SE Rayon, 5000 ft elev.; 5 mi SW Motozintla, 1900 m elev.

Almost all of the Chiapas localities are in the pine zone. The Motozintla specimens were collected in cloud forest in dense epiphytes on a fallen limb in company with *Chelicerca spinosa.* The Tuxan males are exceptionally small (body length 6.6 mm) and the left nodule of HP, although having the nodular shape of typical *C. nodulosa*, lack microechinulations.

At this time I do not want to undertake determination of the taxonomic status of each of the above series, however, the following new species is described.

Chelicerca chamulae Ross

new species

(FIGURE 50)

Holotype.—Male, on slide, CAS. Data.—Mexico: Chiapas: Cerro Huitepec, 8500 ft elev., near San Cristobal de las Casas, matured in culture 29-XI-76 (E. S. Ross).

Name basis.—Chamula, the name of one of the important Indian tribes in the type locality's region.

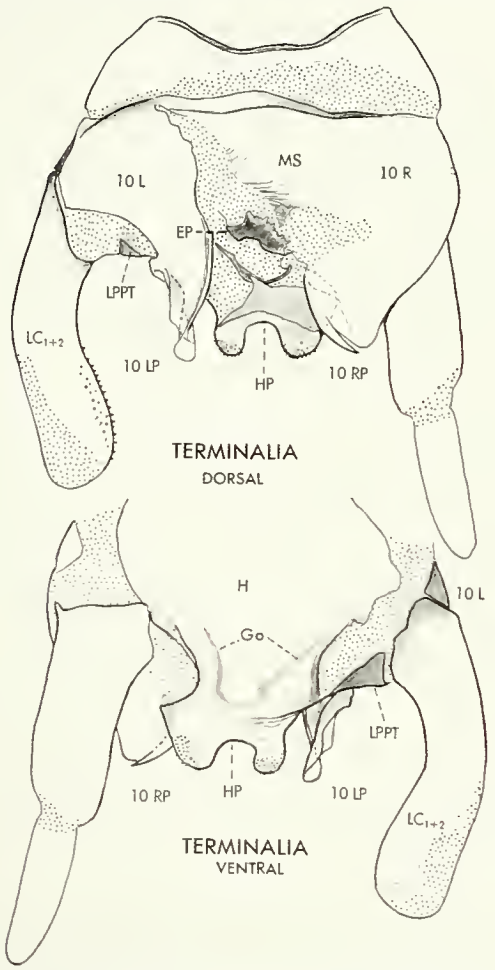

FIGURE 50. *Chelicerca chamulae* Ross, holotype. Type locality: Mexico: Cerro Huitepec, Chiapas.

Description.—Appearance: Moderately large, alate; dark brown except for yellow prothorax and yellowish tan coxae, trochanters and femora. Color details.—Cranium brownish black; antennae uniformly dark brown; mandibles dark amber yellow; prothorax entirely golden yellow; pterothorax dark chocolate brown, all legs yellow tan except medium brown tibiae and tarsi; abdomen light brown except for very dark brown sclerotic portions of terminalia (except for dark amber yellow 10 RP). Dimensions (on slide): Body length 9.5 mm; forewing length 7.0 mm, breadth 1.75 mm.

Important integumental characters.—Eyes small, interspace four eye-widths wide. Most antennal segments are very slender, elongate, 22-segmented (complete). Hind basitarsi elongate, five times longer than wide. Terminalia as figured. Very similar to *C. nodulosa*, differing in the closely spaced, exceptionally large nodules of HP, the small widely-spaced eyes, and much larger size.

Paratypes.—A series of adult males from the holotype's culture deposited in CAS, USNM, and UNAM.

Females will be described in a future treatment of the *Nodulosa* Group. The type culture was stocked with females collected under stones in dense tropical forest at the crest of Cerro Huitepec (a sacred Indian location).

Additional record.—A male with exceptionally large wings from Mexico: Chiapas, 2000 m Mpio: Angel Abino Corzo Reserva El Triúnfo, Sendaro Cerro Bandera, 19-XI-2001 (P. W. Kovarik).

MAXIMA GROUP

Males very large, (the largest Mexican species of *Chelicerca*, body length 12-13 mm), alate. Mandibles broad, apically sharp, without medial flanges. Flagellar antennal segments relatively short (keg-like), their sides curved; thickest at mid-length, segments gradually decreasing in size toward antennal apex, 25-segmented (complete). Entirely dark brown except for golden yellow prothorax. Hind basitarsi very long, five times longer than broad, densely, evenly setose on plantar surface. Epiproct fold (EP) sclerotized, broadest toward left and microspiculate. Inner margin of 10 RP straight, its talon crosses the broad, semicircular outer apex. Gonaphophysis "rods" (GO) sclerotized, equal in size, narrow in form. Hypandrium process (HP) evenly sclerotized, narrowly rimmed without spiculation or nodules except for a small, acute submedial point. Cerci stout, evenly sclerotized; LC_1 broadly expanded and

coarsely echinulate on inner side; LC_2 broadly fused with LC_1, evenly sclerotized, lacking membranous line of fusion.

Chelicerca maxima Ross

(FIGURE 51)

Chelicerca maxima Ross, 1984:34, fig. 12.—Szumik, 1996:41 (cladistics).

Holotype.—Male, on slide, CAS. Data.—Mexico: Guerrero: 3 mi S of Acahuizotla (on old route of Hyw. 95), matured in culture 20-IV-47 (E. S. Ross).

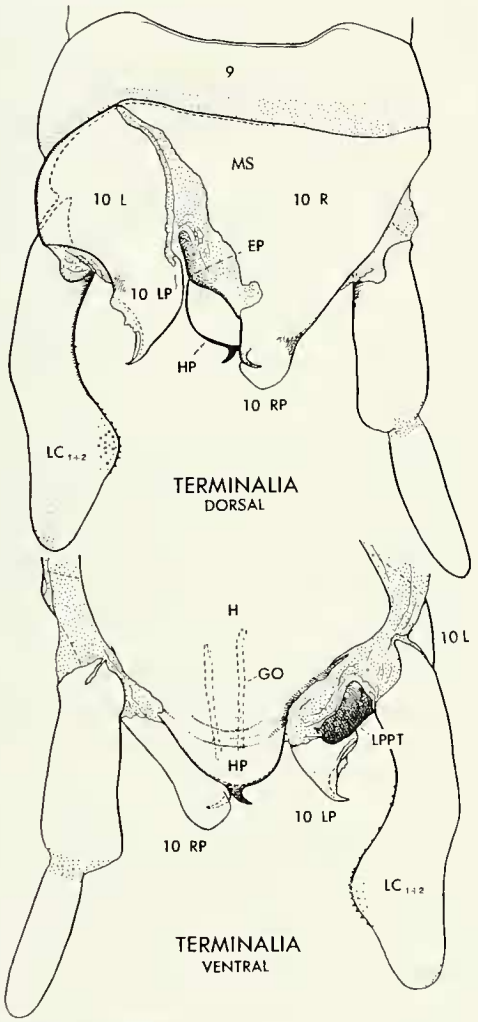

FIGURE 51. *Chelicerca maxima* Ross, holotype. Type locality: Mexico: 3 mi S of Acahuizotla, Guerrero.

Paratypes.—Four males from holotype's culture parented by allotype (CAS).

Discussion.—The type culture didn't thrive because the allotype's small brood were males. The original description and figures, here reproduced, are adequate for recognition of this large, relatively spectacular, distinct species.

SPINOSA GROUP

Males large (body length 10 mm). Mandibles short, without subapical flanges. Flagellar antennal segments slender, their sides almost straight, 22-segmented (complete). Dark brown except for golden yellow prothorax, all coxae, trochanters and femora, as well as antennal segments 3 to 5, others grading to brown distad. Hind basitarsi elongate; large basal plantar setae slanted distad; those in distal half shorter, directed ventrad. Epiproct fold (EP) weakly sclerotized, broadest medially. 10 RP talon long, narrow, arising on inner base of process; caudal extension of process tapered to a blunt point. Gonapophysis "rods" (GO) sclerotized equal in size and form. Hypandrium process (HP) well sclerotized, broad-rimmed, with a very fine, sharp spine on left caudal margin directed toward left. Cerci stout, inner apex of LC_1 greatly expanded, coarsely echinulate; LC_2 less sclerotic, line of fusion with LC_1 membranous, diagonal.

Chelicerca spinosa Ross

(FIGURE 52)

Chelicerca spinosa Ross, 1984b:36, fig. 12.

Holotype.—Male, on slide, CAS. Data.—Mexico: Chiapas: 5 mi SW Motozintla (Hyw. 211), 1900 m elev., matured in culture 15-XII-80 (E. S. Ross).

Paratypes.—Two males, CAS, with holotype data.

Habitat.—In dense epiphytes on fallen limb of a cloud forest tree at crest of a pass. A species of *Chelicerca* of the Nodulosa Group was found in the same habitat.

Discussion.—A damaged, conspecific male (CAS) intercepted in plant quarantine in a shipment of *Odontoglossum* dispatched from Guatemala City, proves that the species occurs in Guatemala, perhaps in mountains just south of the Chiapas border.

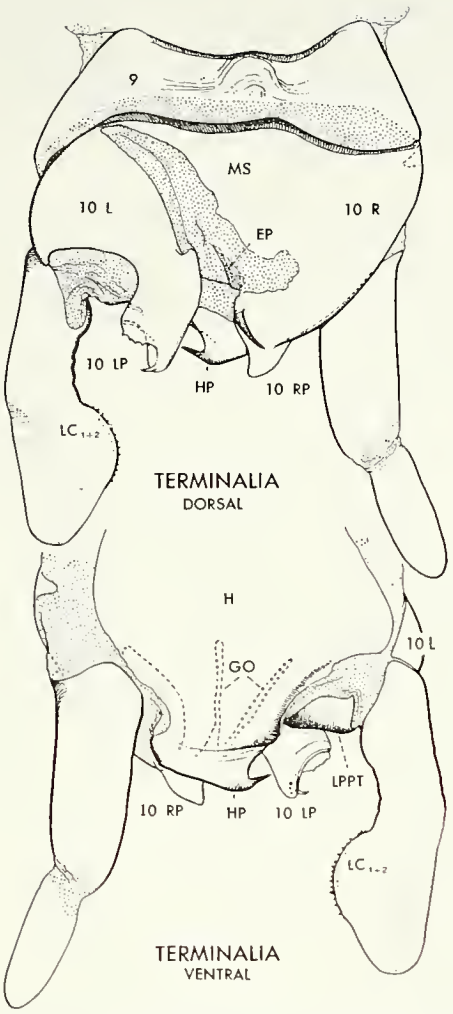

FIGURE 52. *Chelicerca spinosa* Ross, holotype. Type locality: Mexico: 5 mi SW of Motozintla, Chiapas.

The species is somewhat related to *C. maxima,* but differs in coloration, especially that of the legs; the slender, normal shape of antennal segments; and many terminalia distinctions, especially that of the spine of HP.

JALISCOA GROUP

Adult males with a broad, acute medial flange on left mandible; mandibles short. Apterous or alate. Hind basitarsi short; basal plantar setae especially long. Basal apodemes on T-8 and T-9 of abdomen are large, slender. Cleft of terminalia with scattered sclerites, including a sclerotic epiproct (EP) arc. 10 LP exceptionally large, broad, with a small hook on inner caudal angle. 10 RP broadly rounded, its talon arising on the short inner margin of the process and abruptly angled, or curved, toward right. Gonapophysis "rods" (GO) prominent. HP broad, truncate without a prominent spine or nodules. LC_{1+2} as in the *Nodulosa* Group; its inner side straight, not distally lobed.

Females.—Almost uniformly tan, cranium golden yellow.

Distribution.—Widespread in highlands of central Mexico.

Chelicerca jaliscoa Ross

(FIGURE 53)

Chelicerca jaliscoa Ross, 1984b:32, fig. 11.—Szumik, 1996:52 (discussion).

Holotype.—Male, on slide, CAS. Data.—Mexico: Jalisco: 5 mi W Jiquilpan, matured in culture1-III-79 (E. S. Ross).

Paratypes, allotype and parallotypes.—Numerous adults reared in type culture deposited in CAS, USNM, UNAM and BMNH.

Discussion.—The original description adequately describes this small species. Colonies occur under stones in the following additional localities: Michoacan: 8 mi S Quiroga, 7000 ft elev.; 3 mi E Zacapu, 1950 m elev.; 5 mi W Jacona. Hidalgo: Ixmiquilpan (NW of Pachuca). Males in the last-cited locality are always winged and may possibly represent a distinct new species. All cultures were collected by me. Those from Jalisco and Michoacan produced adults during IX, X, and mostly during XI; alate males from Hidalgo matured during III. These series are deposited in CAS.

Genus *Dactylocerca* Ross

Anisembia (*Dactylocerca*) Ross, 1940b:659.

Chelicerca (*Dactylocerca*) Ross, 1944:454; 1957:52.

Dactylocerca Ross, 1984a:85; 1984b:37.—Szumik, 1996:41. (As a syn. of *Chelicerca* Ross, in error).

Type species.—*Anisembia* (*Dactylocerca*) *rubra* Ross.

Name basis.—Greek, *dactylos* = finger, in reference to the often finger-like left cercus of males.

Distribution.—NW Mexico northward into SW United States.

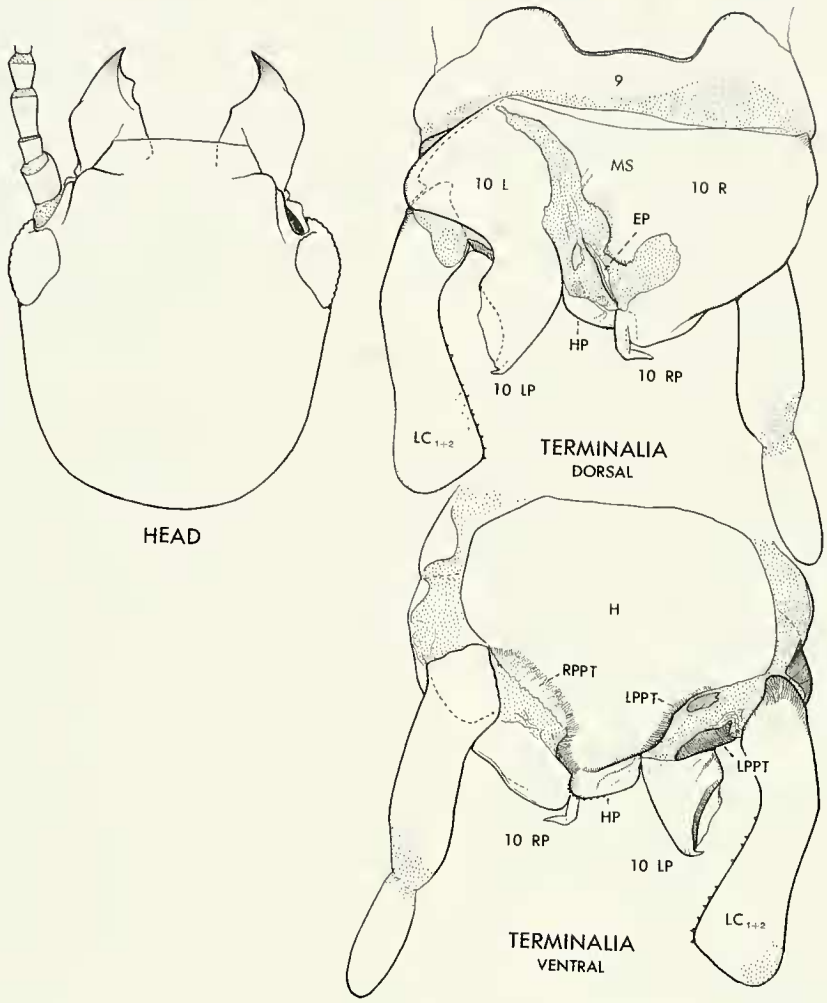

FIGURE 53. *Chelicerca jaliscoa* Ross, holotype. Type locality: Mexico: 5 mi W of Jiquilpan, Jalisco.

Diagnosis.—Adult males small, always winged; head and terminalia black, other portions partly black, reddish, or yellow. Mandibles small, some species lacking a subapical flange on left mandibles, others with an increasingly large, acute flange. Wings small, slender, RBS slanted into costa well before wing apex; cross-veins, if any, confined to RBS-RP. Hind basitarsus short, only twice as long as thick, caudo-basal plantar setae exceptionally long, as long as width of segment. Terminalia complex, as large as head; 10 L small, its process (10 LP) strongly tapered, its apex twisted; MS and 10 R very large, the latter not extended caudad as a distinct process, instead it is broadly arcuated and in most species terminated on its outer corner with either a small talon, or a minute point (10 RP). Epiproct (EP) heavily sclerotized, bearing in some species (*Rubra* Group) a basad-slanted, dense cluster of recumbent, long spicules. All species have heavily sclerotized gonapophysis "rods" (GO) stiffening the ejaculatory duct. Hypandrium process (HP) complex, broad, its caudal margin usually greatly extended forward dorsally over its ventral surface; this upper surface is variably spiculated, ultimately within a series of species having a cluster of large, sclerotic spicules projecting leftward in the extreme left basal corner, or with the caudal margin only slightly folded forward over the ventral margin of HP (*Parva* Group). Basal segment of the left cercus (LC_{1+2}) usually long, at times C-shaped with vestige

of LC_2 usually represented only by a flat, membranous, non-inflated area.

Females.—Small, slender, unicolorous reddish or yellowish.

Discussion.—Based on a cladistic analysis and without knowledge of the yet-to-be described many species of the genus, Szumik decided to consider *Dactylocerca* a junior synonym of *Chelicerca* Ross. My large collection of both genera indicates that *Dactylocerca* should be regarded as a distinct genus. Indeed, the collection reveals that the genus comprises four Species-Groups which in future studies may be treated as genera, or at least subgenera. The same consideration might be given to *Chelicerca,* which has proved to be a very large complex of species which tentatively are assigned to Species-Groups. Admitedly species of the *Parva* Group of *Dactylocerca* have some *Chelicerca* features, but most other species assigned to *Dactylocerca* appear to comprise a well-defined genus. Unfortunately, in nature species do not always become confined in distinctly walled "boxes" termed genera. Yet, without at times arbitrary generic divisions, large complexes of species, such as those of the subfamily Chelicerinae, would be unwieldy melanges.

Dactylocerca rubra (Ross) may be the most cold climate-enduring species of the order, ranging northward from its "heartland" in Mexico into SW United States areas experiencing subzero temperature winters. The genus extends southward, primarily on the western Mexican Plateau and mountains as far south as Michoacan. Species also occur in lowlands of Sonora.

All species live in small colonies under stones (which may extend down into cracks of certain types of soils, such as lateritic). Each colony consists of the brood of a single female. The well pigmented, often melanized adult males probably disperse diurnally in flight and have been collected by sweeping low vegetation during a limited maturity season. The reclusive females are uniformly yellow tan or brick red in color.

KEY TO SPECIES-GROUPS AND SPECIES OF *DACTYLOCERCA*

(Adult males)

1. Cranium dark brown or blackish 2
— Cranium reddish amber (*Ferruginea* Group) .. .. *ferruginea*
2. Body, including sclerites, entirely amber yellow; head and terminalia dark brown, coxae, trochanters and basal half of femora amber yellow ..... *xanthosoma*
— Cranium, pterothorax and terminalia dark brown, legs entirely brown 3
3. Epiproct (EP) with a tight recumbent cluster of elongate spicules slanted basad. Left basal corner of HP lacking a spiculate area. Left cercus C-shaped (*Rubra* Group) 4
— Epiproct without basally-directed spicules. Left basal corner of HP with or without spicules. Left cercus straight or only feebly arcuate 6
4. Small species (body length 5.5 mm), caudal margin of HP reflexed dorsally only a very short distance forward, its right corner an echinulate lobe. San Carlos Bay, Sonora ..... *sancarlosa*
— Larger species (body length at least 6.5 mm), caudal margin of HP extensively reflexed dorsally, its right corner lacking a distinct lobe. SW United States, NW Mexico 5
5. Caudal margin of 10 RP broadly, evenly arcuate, its right extremity terminated by a minute triangular point. NW Baja California, widespread in SW USA ..... *rubra*
— Caudal arcuate margin of 10 RP short, its right extremity terminated by a conspicuous tapered talon. SE Arizona, NW Sonora ..... *ashworthi*
6. Caudal margin of HP very slightly folded forward, its left-base lacking spiculation (*Parva* Group) 10
— Caudal margin of HP extensively folded forward, forming a dorsal covering of almost entire length of HP, the left basal corner of which is either micro or macrospiculate (*Multispiculata* Group) 7
7. Spiculation on left basal corner of HP minute, evenly spaced on an elongate, membranous swelling. ..... *multispiculata*
— Spiculation increasingly large on a projection at extreme basal left corner of HP 8
8. Left caudal corner of HP angled at 90°. Zacatecas (state) ..... *flavicollis*
— Caudal outline of HP not angulate, semicircular 9
9. Spiculation on caudal corner of HP especially large darkly sclerotic, tightly clustered. Sclerite basad of EP large darkly sclerotized. Left

cercus strongly incurved. Durango (state) .... *durangoa*

— Spiculation on caudal corner of HP rather small, paler, evenly spaced. Sclerite basad of HP weakly sclerotized on right side. Left cercus almost straight. Chihuahua (state)..... ..... *chihuahuae*

10. Arcuation of caudal margin of 10 R extensive, projection (talon) of right corner very short micro-triangulate. Alamos, Sonora ..... *parva*

— Caudal arcuation of 10 R very short; midway a slender talon arises and curves to right beyond curved extension (HP). Ciudad Obregon, Sonora..... *sonorae*

RUBRA GROUP

Adult males with sclerotized portions of head, body and legs blackish brown. Terminalia with a dense cluster of long spicules slanted basad above epiproct; micro- and macrospicules absent on dorsobasal left corner of HP; left cercus slender, usually strongly C-shaped. Three species occur in NW Mexico with an extension of two into SW USA.

Dactylocerca rubra (Ross)

(FIGURES 54)

Anisembia (*Dactylocerca*) *rubra*, Ross, 1940b:659.

Chelicerca (*Dactylocerca*) *rubra* (Ross), 1944:454; 1957:52.

Dactylocerca rubra (Ross), 1984a:86; 1984b:38.

Holotype.—Male, on slide, CAS. Data.—Mexico: Baja California, Playa Rosarito (near Ensenada), 3-IV-39, (E. S. Ross). Under volcanic stones on crest of mesa above beach.

Distribution.—Numerous, records in NW Baja California, SW California, Great Basin, SE Arizona and New Mexico, from sea level to moderately high elevations in grasslands, and especially under stones in piñonpine-juniper habitats.

Discussion.—The wide geographic and ecological range of this species, with little or no anatomical or color variation is remarkable. Detailed records appear in Ross, 1957 and 1984a.

Dactylocerca ashworthi Ross

(FIGURE 55)

Dactylocerca ashworthi Ross, 1984a:86, figs. 3, 4.

Holotype.—Male, on slide, CAS. Data.—SE Arizona: Ridge S of Parker Cyn., W side of Huachuca Mtns., Santa Cruz Co., 5600 ft elev., 3-V-77 (E. S. Ross).

Discussion.—Appearance almost identical to *D. rubra*, but slightly darker. Significantly differs in the much shorter arc of the caudal margin of 10 R with a larger more acuate talon (10 RP), a narrower HP, a slightly bulbous apex of LC_{1+2}, and other details.

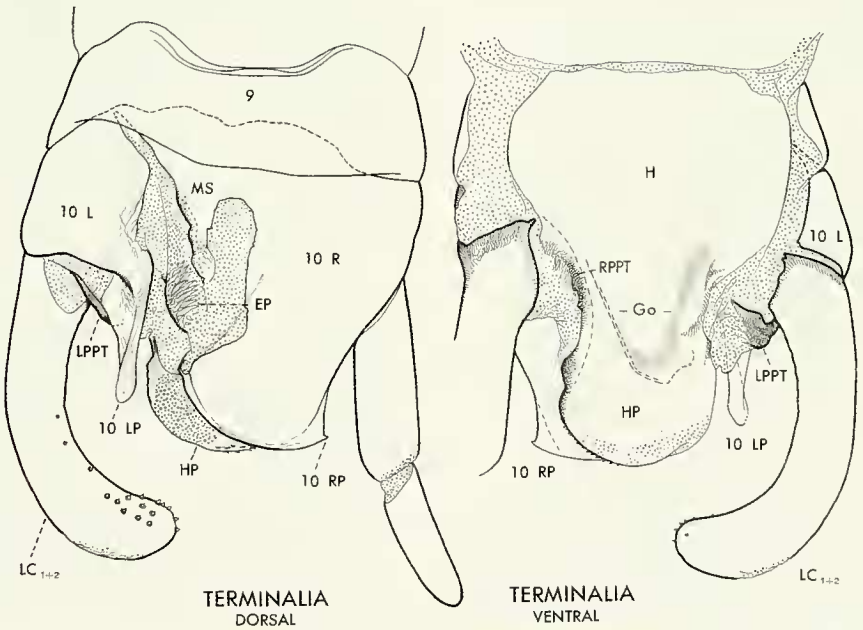

FIGURE 54. *Dactylocerca rubra* (Ross), holotype. Type locality: Mexico: Playa Rosarito, Baja California.

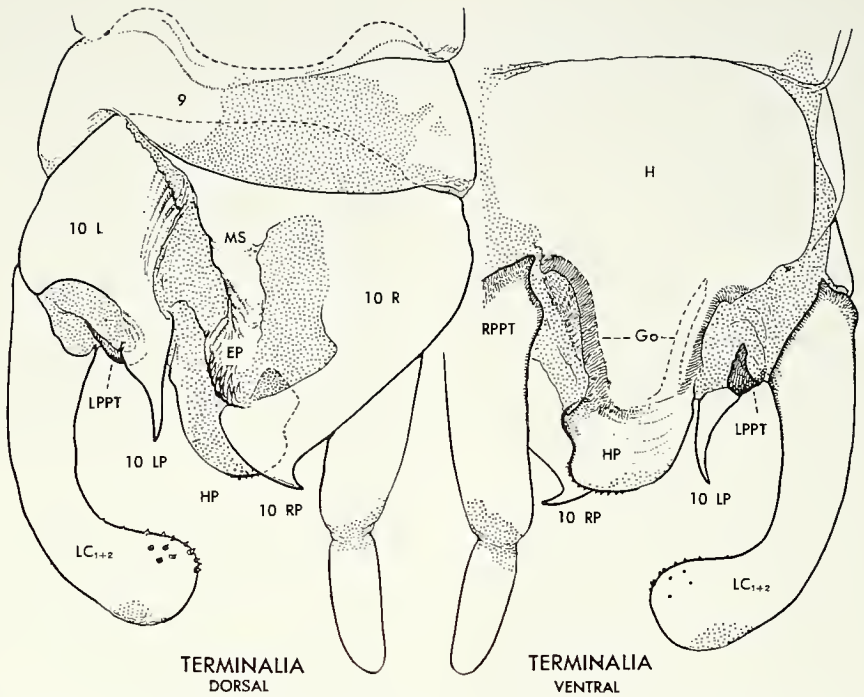

FIGURE 55. *Dactylocerca ashworthi* Ross, holotype. Type locality: Arizona: W side of Huachuca Mtns.

Like all others of the genus, this species occurs in small colonies under stones, especially those on soils cracking when dry. In the United States it is limited to areas of SE Arizona just north of the Mexican border. Probably it is widespread in mountainous regions of northern Sonora.

Dactylocerca sancarlosa Ross

new species

(FIGURE 56)

Holotype.—Male, on slide, CAS. Data.—Mexico: Hills NW of Bahia San Carlos (near Guaymas), Sonora. Matured in culture 21-V-79 (E. S. Ross).

Description.—Appearance: Similar to *D. rubra* but only half as large. Mandibles without flanges. Antennae uniformly brown, 16-segmented. Body, including prothorax and all legs, uniformly dark brown. Terminalia, as figured, similar to *D. rubra* except as follows: 10 LP apex very slender; caudal arc of 10 R shorter, talon (10 RP) larger, acutely pointed; "rods" of ejaculatory duct (GO) very large, darkly sclerotic; caudal margin of HP transversely straight instead of arcuate, only slightly folded forward, left side with a finely spiculate membranous area, right corner having a sclerotic, spiculate, rounded swelling; LC_{1+2} very slender, elongate, C-shaped, not distally swollen. Dimensions (on slide): Body length 5.5 mm; forewing length 3.0 mm, breadth 0.75 mm.

Paratypes.—Males from holotype's culture deposited in CAS.

Discussion.—This, the smallest species of the genus, occurs under small stones at the mouth of a rocky canyon with a small grove of native fan palms. The species may be highly localized because such a habitat apparently doesn't occur elsewhere on the coast of Sonora. At this locality I also collected another small new species of *Dactylocerca (ferruginea)* which is distinct in its entirely rust red coloration and anatomical characters. Surprisingly, *Bulbocerca sini* (Chamberlin), a species otherwise known only from Loreto, Baja California, was also found at this locality. Colonies of all species were very small, difficult to find.

FERRUGINEA GROUP

Adult males entirely ferrugineous, or amber yellow. Lacking a sclerite or clustered, recumbent spi-

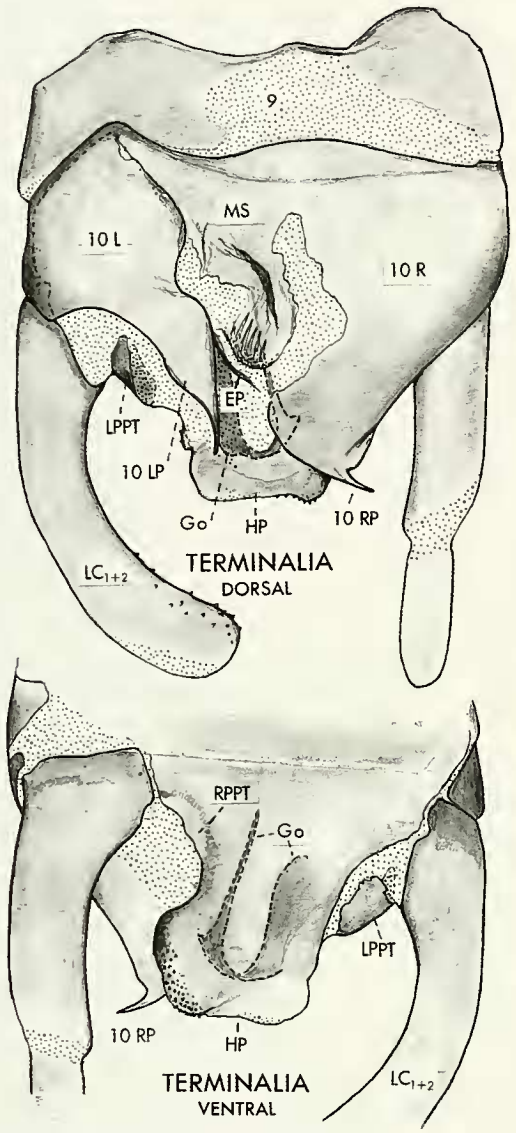

FIGURE 56. *Dactylocerca sancarlosa* Ross, new species, holotype. Type locality: Mexico: Bahia San Carlos, Sonora.

cules on epiproct's caudal margin. 10 LP broad-based, abruptly, acutely, tapered distad. Caudal margin of 10 R short, bearing a large, slender talon. HP broad, weakly sclerotized, lacking conspicuous spiculation, or lobes. Left cercus almost straight, apex not swollen. One species from Bahia San Carlos, Sonora.

Dactylocerca ferruginea Ross
new species
(FIGURE 57)

Holotype.—Male, on slide, CAS. Data.—Mexico: Hills NW of Bahia San Carlos (near Guaymas), Sonora. Matured in culture 16-VII-77 (E. S. Ross).

Description.—Appearance: Small, alate; color generally ferrugineous with black eyes; wings and appendages light brown. Color details (freshly killed): Cranium uniformly reddish amber, lacking pattern, setae black; eyes black; basal two antennal segments straw yellow, all others grayish yellow, becoming darker distad, 16-segmented (complete); mandibles pale amber, reddish apically; all other mouthparts pale reddish amber except for distal segment of each palpus which is contrastingly blackish. Body uniformly reddish except for terminalia which are varied shades of yellowish brown with bases of cerci piceous. Wing stripes smokey black. Coxae, trochanters and femora of fore- and mid-legs amber yellow, tibiae and tarsi chestnut brown. Coxae of hind legs amber yellow, all other segments varied shades of chestnut brown. Dimensions (on slide): Body length 6.0 mm; forewing length 3.0 mm, breadth 0.6 mm.

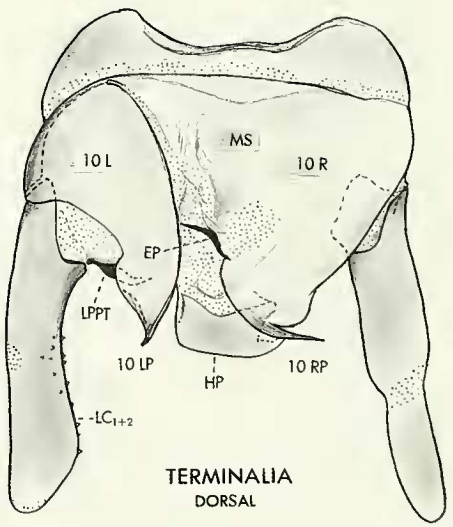

FIGURE 57. *Dactylocerca ferruginea* Ross, new species, holotype. Type locality: Mexico: Bahia San Carlos, Sonora.

Anatomical distinctions.—Left mandible with an obtuse medial flange. Terminalia without conspicuous recumbent spicules, or a sclerite basad of a sclerotic epiproct arc; left process (10 LP) very broad-based, then abruptly, acutely tapered; inner caudal margin of 10 R arcuate and continued caudo-laterad as a large, slender talon; right caudal margin of 10 R narrowly arcuated, not extended beyond the talon; caudal margin of HP feebly arcuated, weakly sclerotized, microspiculations minute, scarcely visible, folded dorsad, lacking surface spiculation in left caudal corner; left cercus almost straight, apex only slightly swollen.

Paratype.—One male (CAS). No female specimens.

Discussion.—This species is instantly recognized by its uniformly pale coloration (not teneral), the limited caudal arcuation of 10 R, and its conspicuous talon.

MULTISPICULATA GROUP

Left mandible with a prominent medial flange. Caudal edge of epiproct (EP) without a cluster of forward-directed, recumbent spicules. Upper left (basal) corner of hypandrium process (HP) with few to many spicules. When few in number they are large and coarse; when numerous, as in *D. multispiculata*, they are very small, evenly spaced, on a broad lobe. Left cercus (LC_{1+2}) nearly straight, apex not globose.

Dactylocerca multispiculata Ross

(FIGURE 58)

Dactylocerca multispiculata Ross, 1984b:38, fig. 13 (left).

Holotype.—Male, on slide, CAS. Data.—Jalisco: 20 mi W of Jiquilpan, matured in culture C-14-VIII-48 (E. S. Ross).

Paratypes and parallotypes.—From holotype's culture deposited in CAS, UNAM and USNM.

Additional records.—Jalisco: 2 mi W Valle de Guadeloupe (E. S. Ross). Jalisco: 17 mi Acatlan de Jalisco, 1320 m elev. (E. S. Ross). Jalisco: 13 mi N Tabasco, 5200 ft elev. (E. S. Ross). Specimens from this locality have fewer HP spicules which increase in size toward left-base. Zacatecas: Ruins Chicomoztoc, near Villanueva, 6400 ft elev. (E. S. Ross). HP spiculation similar to that of Tabasco specimens. Populations in the following localities may represent a new species: Michoacan: Tiritepio (E. S. Ross). HP spiculation similar to that of topotypes. Durango: 25 km W of Durango, 2250 m elev., (E. S. Ross). HP spiculation larger and more sparse.

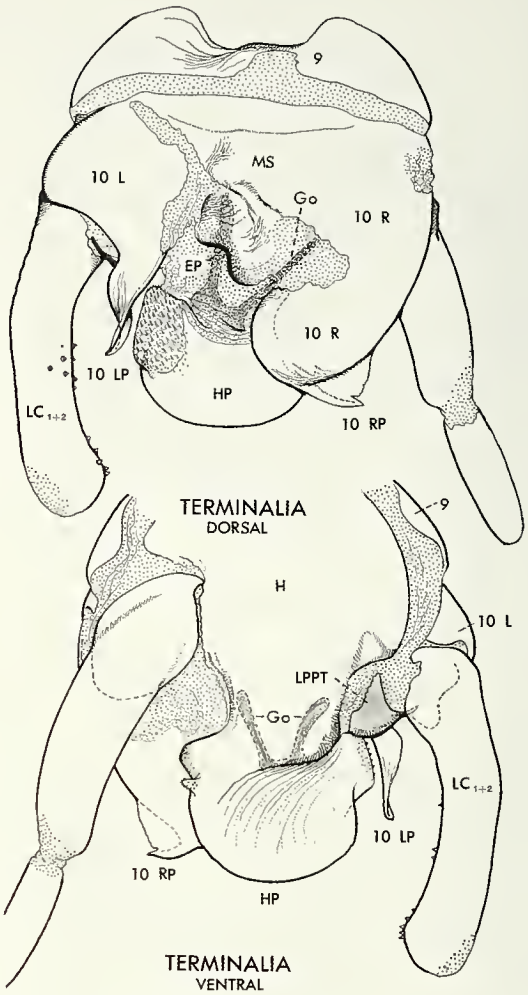

FIGURE 58. *Dactylocerca multispiculata* Ross, holotype. Type locality: Mexico: 20 mi W of Jiquilpan, Jalisco.

Dactylocerca flavicollis Ross

(FIGURE 59)

Dactylocerca flavicollis Ross, 1984b:40, fig. 13 (right).

Holotype,—Male, on slide, CAS. Data.—Zacatecas: 4 mi N Fresnillo (Hwy. 45), 2350 m elev.; matured in culture 19-VIII-60 (E. S. Ross).

Discussion.—This species is distinguished by the large, coarse spiculation of the left basal corner of

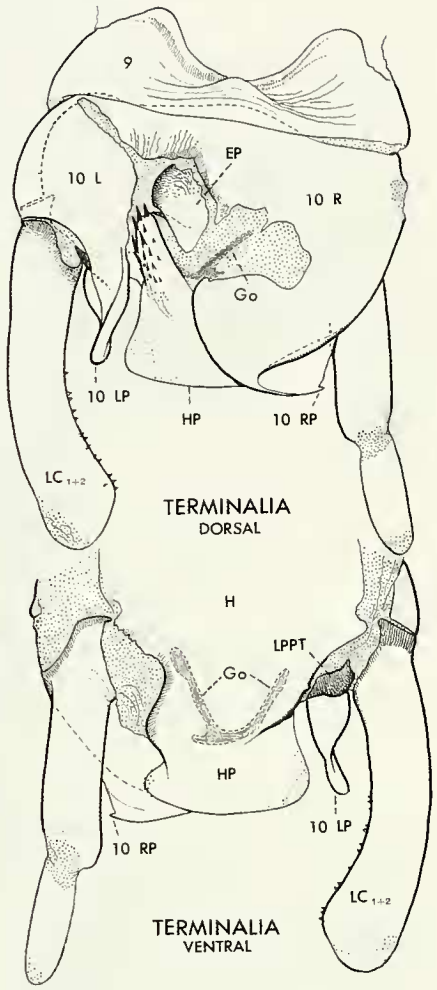

FIGURE 59. *Dactylocerca flavicollis* Ross, holotype. Type locality: Mexico: 4 mi N of Fresnillo, Zacatecas.

HP, which are concentrated on a sclerotic lobe. The 90° left-posterior angle of the very thin HP is also distinctive. The prothorax and interscleral portions of the body are brilliant orange. The pterothoracic sclerites and all legs are entirely dark brown. Females are almost entirely straw yellow with a uniformly amber yellow cranium.

Numerous paratypes and parallotypes were cultured. A large series was also cultured from Zacatecas: 12 mi SE Zacatecas (Hwy. 49) about 8000 ft elev. (E. S. Ross). As usual for species of the genus, culture stock was collected under stones in cactus-thornbush grassland used as pasture.

Dactylocerca xanthosoma Ross

new species

(FIGURE 60)

Holotype.—Male, on slide, CAS. Data.—Jalisco: 2 mi SE Ixtlan del Rio, 1400 m elev., matured in culture 30-VIII-60 (E. S. Ross).

Description.—Appearance: Small, alate; body and most portions of legs yellow, antennae and terminalia brownish black. Color details (in alcohol): Cranium alutaceous dark mahogany brown; antennae entirely medium brown, 19-segmented (complete). Forelegs medium brown except for yellow basal half of femora, trochanters, and coxae; midlegs almost entirely yellow; hindlegs yellow except for light brown tibiae. Wing stripes light brown. Terminalia varied shades of glossy dark mahogany brown. Dimensions (on slide): Body length: 6.5 mm; forewing length 3.75 mm, breadth 0.9 mm.

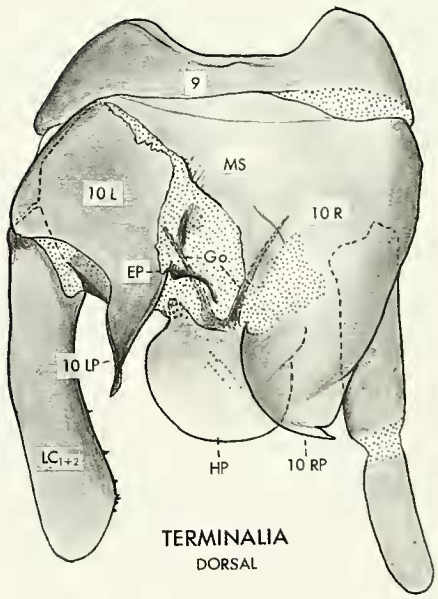

FIGURE 60. *Dactylocerca xanthosoma* Ross, new species, holotype. Type locality: Mexico: Ixtlan del Rio, Jalisco.

Anatomical distinctions.—As figured. Noteworthy: the broad, obtuse, medial flange on the left mandible and confinement of HP's small, dorsal spicules to a small nodule on the left basal corner.

Allotype.—Female, in alcohol, from holotype's culture.

Description.—Entirely pale yellow, including legs, except for a golden yellow cranium and gradually darker abdominal terga. Body length: 8.5 mm.

Paratypes and parallotypes.—A large series of adults from the holotype's culture deposited in CAS, USNM, BMNH, UNAM and potentially in other institutions.

Discussion.—This species is readily recognized by the largely yellow coloration of both sexes, as well as by the figured terminalia characters. The pale coloration suggests a close relationship with *D. flavicollis*. However, many terminalia distinctions include: smaller, evenly spaced spiculation of the left base of HP; only an obscure sclerite basad of EP, and an evenly arcuate, semicircular caudal margin of HP, instead of a 90° angle. The male's distinct coloration includes pale, straw yellow translucent body sclerites (except for dark brown terminalia). All coxae, trochanters and femora are likewise pale straw yellow. In contrast, the pterothoracic and abdominal sclerites of *D. flavicollis* are dark brown, as also are all leg segments.

Stock of the type culture was collected under small stones in pasture with scattered cacti and shrubs.

Dactylocerca durangoa Ross

new species

(FIGURE 61)

Holotype.—Male, on slide, CAS. Data.—Durango: 9 mi S San Juan del Rio, 1900 m elev., matured in culture 20-I-61 (E. S. Ross).

Description.—Appearance: Typical for the genus with prothorax and its membranes orange, pterothorax blackish brown, abdomen orange with blackish terminalia. Color details (in alcohol): Cranium jet black, lacking pattern; surface dull, alutaceous. Eyes dark purple. Basal two antennal segments blackish brown, other segments light brown or tan, distal three slightly darker, all joint membranes and segment-margins tinged with red. All sclerotic portions of mouthparts dark brown with

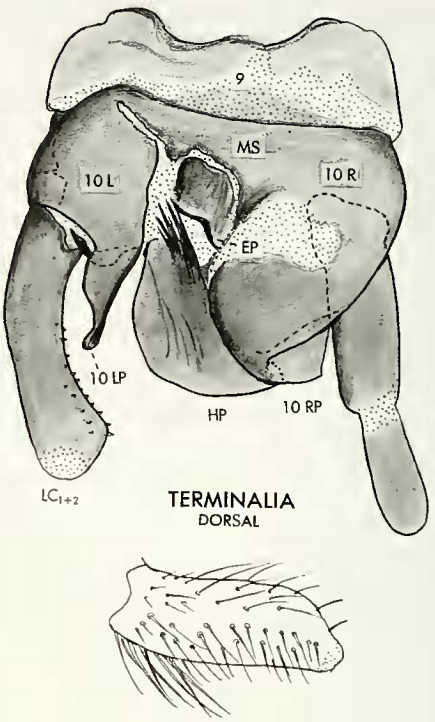

FIGURE 61. *Dactylocerca durangoa* Ross, new species, terminalia and hind basitarsus of holotype. Type locality: Mexico: Durango: 9 mi S of San Juan del Rio, Durango.

creamy white membranes. Prothoracic and cervical sclerites bright orange; pronotum slightly clouded medially with gray in some specimens; all cervical and prothoracic membranes basically pale orange heavily tinged with red. Posternum, associated membranes and anterior portion of mesosternum reddish orange (in *D. flavicollis* the posternum is contrastingly yellow amber). Pterothoracic sclerites and its legs varied shades of dark mahogany brown; sterna and posternum 2 and anterior margin of metasternum mostly orange, all membranes reddish orange. Abdomen orange except for brown sclerotic surfaces; terminalia with pink-to-reddish membranes.

Anatomical distinctions.—Terminalia with a large sclerite basad of rim of epiproct; basal corner of HP with very large, blackish spicules clumped on a small lobe; caudal corner of HP rounded, HP's

caudal margin broadly, shallowly arcuate. Dimensions (on slide): Body length 6.5 mm; forewing length 4.0 mm, width 1.0 mm.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Cranium golden amber, antennae grading from straw yellow to creamy white distad. Body and legs entirely yellowish tan. Body length 8.0 mm.

Paratypes and Parallotypes.—From holotype's culture. Deposited in CAS, UNAM and USNM.

Dactylocerca chihuahuae Ross

new species

(FIGURE 62)

Holotype.—Male, on slide, CAS. Data.—Mexico: Chihuahua: 12 mi N Chihuahua, matured in culture 6-IX-60 (E. S. Ross).

Description.—Appearance: Almost identical to *D. durangoa*, differing as follows: Cranium dark mahogany brown instead of black, pronotum uniformly pale orange, legs uniformly golden brown.

Anatomical distinctions.—As figured. Preepiproct sclerite reduced, submembranous on its right side. Spicules on basal left corner large, but smaller than those of *D. durangoa*, on a pronounced lobe. Left cercus straight, or only slightly curved. Dimensions (on slide): Body length 5.75 mm; forewing length 3.6 mm, breadth 0.75 mm.

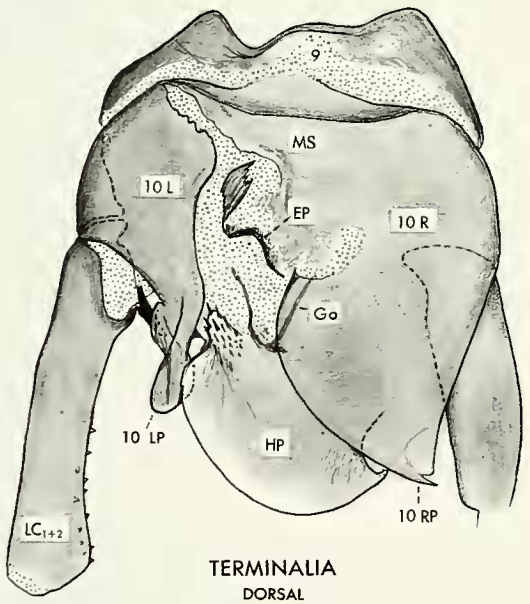

FIGURE 62. *Dactylocerca chihuahuae* Ross, new species, holotype. Type locality: Mexico: 12 mi N of Chihuahua, Chihuahua.

Paratypes and parallotypes.—A few adult specimens from holotype's culture.

Additional records.— 1 mi E La Sauceda, Chihuahua, 7000 ft elev., 21-VII-47 (Rockefeller Expedition) AMNH. 37 mi S Gallego, 1700 m elev., VIII- 60 (E. S. Ross) CAS.

Discussion.—Cultured specimens from intermediate localities in Chihuahua, and adjacent more southernly areas suggest that distinctions from *D durangoa* may be clinal.

PARVA GROUP

Males small, alate. Cranium elongate oval; eyes small, interspace five eye-widths. Left mandible without a medial flange. Wings very slender, RBS merging with C before wing apex, no trace of crossveins. Terminalia basically similar to Rubra Group, differing as follows: cleft of tenth tergite with complex sclerites; the forward-directed spicules of EP few in number, widely spaced. 10 LP broad-based, abruptly tapered, tip twisted; caudal margin of 10 R not as broadly arcuated, in one species short and bearing a long, slender talon not crossing surface of caudal margin; caudal margin of HP not strongly extended over HP's dorsal surface, microspiculation concentrated on left corner; left cercus shorter not forming a narrow arc, its apex bulbous in one species. Mexico: lowlands of Sonora.

The two known species are distinct in many characters, most notably in *D. parva* the caudal margin of 10 R is broadly arcuate and has only a very short talon on its right extremity; in *D. sonorae* the caudal arcuation of 10 R is short and bears a long, slender talon.

The small microspiculate left caudal corner of HP is homologous to the often more coarsely spiculate left corner of the sclerotized dorsal covering of HP.

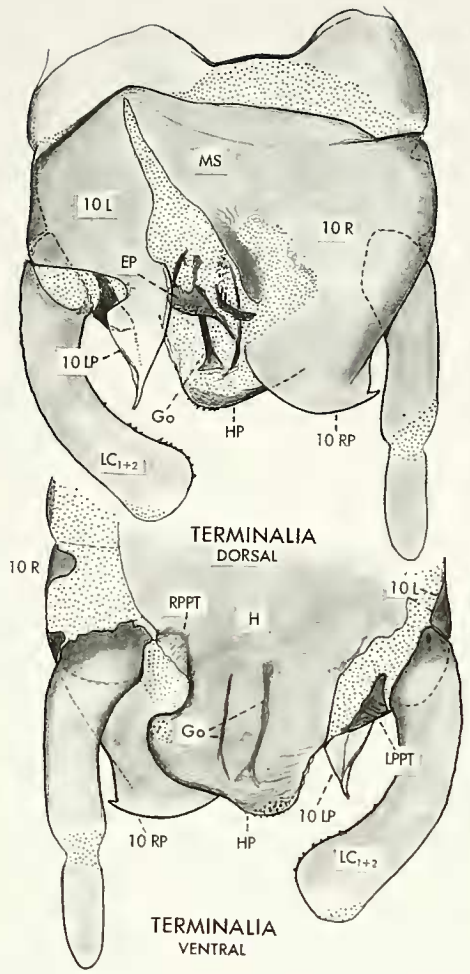

FIGURE 63. *Dactylocerca parva* Ross, new species, holotype. Type locality: Mexico. 7 mi E of Alamos, Sonora.

Dactylocerca parva Ross

new species

(FIGURE 63)

Holotype.—Male, on slide, CAS. Data.—Mexico: 7 mi E Alamos, Sonora, matured in culture 7-XI-60 (E. S. Ross).

Description.—Appearance: Very small, smallest of the genus; body appearing golden yellow; head, antennae, legs and terminalia chocolate brown. Color details: Cranium dark chocolate brown, lacking pattern; antennae uniformly medium brown, 16-segmented (complete); all body membranes golden yellow, prothoracic sclerites pale tan, pterothoracic sclerites chestnut brown; legs medium brown; abdominal sclerites translucent tan; terminalia glossy dark chocolate brown, 10 LP tan distad, membranes pinkish white. Dimensions (on slide): Body length 5.3 mm; forewing length 2.75 mm, breadth 0.6 mm.

Anatomical distinctions.—As figured. Significant characters include the very sclerotic EP with spicules sparse, wide-spaced; the broadly arcuate hind margin of 10 R terminated on right extremity by a small, short point; the arcuate left cercus, bulbous at apex.

Allotype.—Female in alcohol from holotype's culture.

Description.—Cranium golden tan. Entire body and legs yellowish tan, caudal abdominal tergites slightly darker. Body length 8.0 mm.

Paratypes and parallotypes.—Numerous adults from type culture deposited in CAS, UNAM, USNM and BMNH.

Habitat.—Collected under small stones beneath small, dense trees and shrubs, after recent rain.

Dactylocerca sonorae Ross

new species

(FIGURE 64)

Holotype.—Male, on slide, CAS. Data.—Mexico: 10 mi S Cuidad Obregon, 110 m elev., Sonora, matured in culture 6-I-61 (E. S. Ross).

Description.—Appearance: Very small, alate, almost identical to *D. parva* in general appearance and most characters, except in terminalia. Sclerites in cleft of tenth tergite larger and more complex.Three spicules present above epiproct are large, well spaced. Left tergal process (10 LP) very broad-based, sides curved, left side margin sclerotic, apex abrupt, twisted. Caudal margin of 10 R arcuate, short, bearing a conspicuous, slender, arcuate talon. Caudal margin of HP truncate, bearing a fringe of short spicules, dorsal surface of left corner very finely microspiculate. Left cercus relatively short, and stout, not especially bulbous. Dimensions (on slide): Body length 5.5 mm; forewing length 2.75 mm, breadth 0.6 mm.

Allotype.—Female in alcohol from holotype's culture.

Description.—Cranium amber yellow, eyes black, antennae almost uniformly creamy white. All body sclerites and legs amber yellow, faintly mottled with tan; all interscleral areas and cerci only slightly paler than sclerites. Body length 6.0 mm.

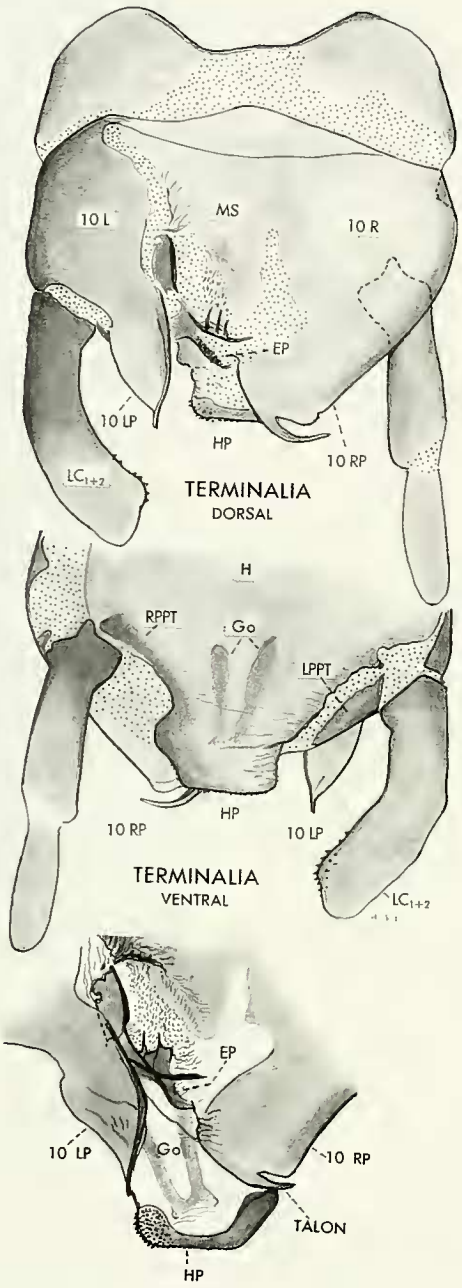

FIGURE 64. *Dactylocerca sonorae* Ross, new species, holotype. Type locality: Mexico: 10 mi S of Cuidad Obregon, Sonora.

Paratypes and parallotypes.—Numerous adults from holotype's culture deposited in CAS, UNAM, USNM, and potentially other institutions.

Discussion.—This species is readily distinguished by conspicuous differences in the caudal portion of 10 R and its talon.

Genus *Pelorembia* Ross

Pelorembia Ross, 1984b:41.—Szumik, 1996:41 (in error as a synonym of *Chelicerca* Ross).

Type species.—*Pelorembia tumidiceps* Ross, by original designation.

Distribution.—Southern Mexico.

Description (males).—Very large, body length averaging 17 mm, nymphaform, apterous. Blackish brown except for largely orange thorax and legs. Head massive, as broad as long, almost circular, heavily sclerotized; eyes small, nymphoid; mandibles short, stout, coarsely dentate basad of nondentate apices; antennae small, segments short, dark to apex. Legs stout, as in nymphs and females; plantar setae of hind basitarsus equal in size, very dense. Tenth tergite narrowly cleft to base. Left process (10 LP) short, lateral margins carinate, intervening trough transversely strigose; apical margin lobed on left corner. Right process (10 RP) bearing a small outer-apical hook subtended by a blunt lobe. Epiproct (EP) almost obsolete, represented only by membranous folds. Ninth sternite (H) and its lobe (HP) evenly, strongly sclerotized; the latter caudally attenuated to form a thumb-like medial lobe on a non-echinulate margin. Gonapophysis "rods" (GO) prominent. Left paraproct (LPPT) sclerotic, detached; right paraproct, fleshy, unsclerotized. Cerci stout, both two-segmented; basal segment of left cercus thick with a finely and densely echinulate, globose, subapical lobe. Females superficially resembling males except for head form and terminalia.

Discussion.—The unusual body and head characters of the male may be attributed to a high degree of neoteny. The atypical (non-anisembiid) subapical complexity of the mandibles must be partial retention of the nymphal mandibular condition. In spite of the simplicity of the terminalia, the genus appears to be related to the *Wheeleri* Group of *Chelicerca*.

Strangely, without explanation, Szumik (1996) synonomized this genus with *Chelicerca* Ross, a very large complex, of species which needs to be subdi-

vided into several genera, some of which are tentatively treated as Species-Groups in the present study. Gigantism, a high degree of male neoteny, and spectacular coloration, combine to make *Pelorembia* the most readily recognized American embiid genus.

Pelorembia tumidiceps Ross

(FRONTISPIECE and FIGURES 65)

Pelorembia tumidiceps Ross, 1984b:41.—Szumik, 1996:51 (in cladogram).

Holotype.—Male, on slide, CAS. Data.—Mexico: 3 mi E of Chilpancingo, Guerrero, XI-46 (E. S. Ross).

Description.—Characters of the genus, as figured. Body length: 16.5 mm, cranial length (from clypeal margin) 2.5 mm, breadth 2.5 mm.

Allotype.—Female, in alcohol, from holotype's culture, CAS.

Description.—Identical in size and coloration to males except, of course, for head and genitalic structures.

Paratypes and parallotypes.—Numerous topotypic males and females deposited in CAS, USNM, BMNH and UNAM.

Discussion.—No other species even remotely resembling *D. tumidiceps* has been found and thus its recognition is easy. Its colonies occur in dry bark

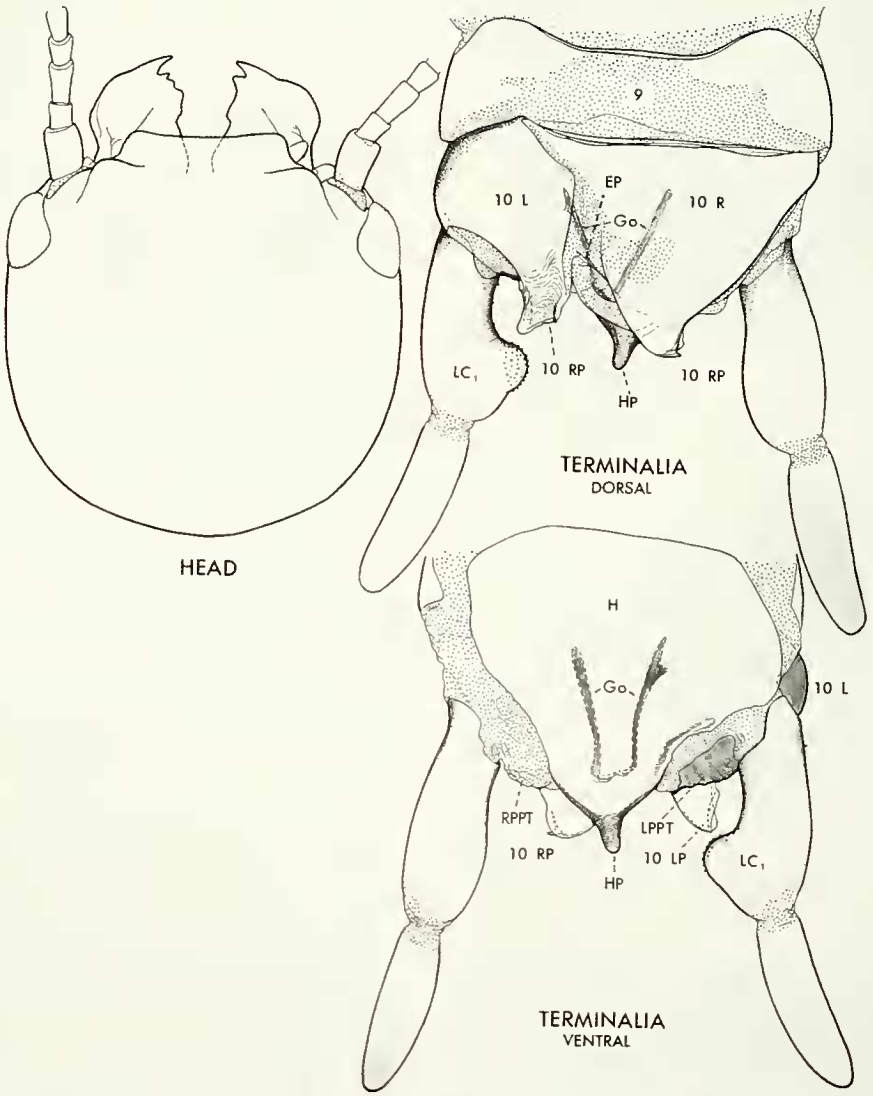

FIGURE 65. *Pelorembia tumidiceps* Ross, holotype. Type locality: Mexico: Chilpancingo, Guerrero.

crevices of small palmettos (6 to 8 feet high) in a semi-arid life zone of Guerrero, a habitat characterized by an abundance of a white-blossomed tree morning glory. Colonies may also consist of a patch of silk associated with a crevice retreat in the bark of trees in dense, second-growth thickets. Apparently, the species doesn't occur under numerous stones in its habitat, as does a small, new species of *Chelicerca* in the same locality.

CHELICERCA OF MESOAMERICA

Except for *Chelicerca spinosa* Ross of southern Mexico which ranges into NW Guatemala, and possibly other Mexican species, the *Chelicerca* fauna of Mesoamerica is distinct. Unlike most Mexican species of the genus, except *C. dampfi* Ross, males of which have a one-segmented left cercus and often are apterous, all Mesoamerican species possess wings and a two-segmented left cercus. They are here assigned to six Species-Groups, five of which are monotypic. The *Ruficollis* Group, however, contains many species which are often distinguished by minor, yet consistent characters. Future fieldwork should result in a great increase in the number of Mesoamerican *Chelicerca* species, especially in highlands which to date have proved to be richer than lowlands in species diversity.

KEY TO SPECIES-GROUPS AND SPECIES OF MESOAMERICAN *CHELICERCA*

(Adult males)

1. Caudal margin of HP almost entirely membranous, without even a trace of a spine 2
— Caudal margin of HP gradually sclerotic caudad, bearing one or more spines, or conical in shape 3
2. 10 LP bifurcate on left side, caudal margin of HP emarginated, talon of 10 RP closely aligned with caudal curvature of 10 RP (*Maya* Group) ..... *maya*
— 10 LP tapered to a single point, caudal margin of HP arcuate, talon of 10 RP crossing apex of 10 RP dorsally ..... *montazul*
3. Caudal portion of HP evenly tapered to a conical point which is membranous at tip (*Alpina* Group) 4
— Caudal margin of HP bearing one or more spines or nodules; 10 LP with a spine or talon on its left caudal corner 5
4. 10 LP tapered to a large, curved point. Salvador ..... *alpina*
— 10 LP short, broadly rounded; its point minute, located on outer caudal corner. Guatemala ..... *guatemálae*
5. Caudal margin of HP sclerotic, with a broad, right-slanted extension terminated in two, blunt closely-approximated nodules (*Esteli* Group) ..... *esteli*
— Caudal margin of HP either sclerotic with a large, acute spine directed leftward, or with its left side membranous bearing only a minute point on its right side (absent in some species) 6
6. Caudal margin of HP entirely sclerotic, its spine large 7
— Caudal margin of HP membranous on left side, its spine on right side minute, or absent. (*Ruficollis* Group) 8
7. Left cercus one-segmented; talon of 10 RP slender, arising on the inner side of the process, the apex of which projects caudad beyond the talon. S Mexico, NW Guatemala. (*Spinosa* Group) ..... *spinosa*
— Left cercus two-segmented, talon of 10 RP a broad-based, triangular point located on caudal corner of the caudally-truncate process. Honduras (*Yojoa* Group) ..... *yojoa*
8. Talon of 10 RP slender, sickle-shaped, arising on left side of 10 RP and crossing toward right across its apex 9
— Talon of 10 RP short, broad-based, triangular, located on its extreme right caudal corner . 12
9. Eyes very large, cranial interspace less than one eye-width 10
— Eyes relatively small, cranial interspace at least two eye-widths wide 11
10. Unicolorous; wings large, extending at least 3 mm beyond apex of abdomen .... *brunneicollis*
— Multicolored; prothorax and femora-bases golden yellow, or reddish, otherwise mostly very dark brown; wings shorter, not extending beyond abdominal apex ..... *auricollis*
11. Moderately large species (body length about 8 mm); HP spine or talon conspicuous, darkly sclerotic ..... *Ruficollis* Group
— Small species (body length 6 mm); HP spine or talon very small, only a tiny dot.. *villaneillyae*

12. Eyes very large, interspace less than one eye-width. Process on HP reduced to a small dot on process' right side not projected. Paraiso, Costa Rica ..... *paraisoa*

— Eyes relatively small, interspace at least two eye-widths. Process on HP usually a conspicuous sclerotic point on right caudal corner 13

13. Spicules in tenth tergite's cleft large, conical, forming a conspicuous patch without borders; not concentrated to form a sclerotic, inverted arc, an epiproct (EP). Nicaragua .. *matagalpae*

— Spicules smaller, densely clumped, clumped to form an inverted arc, an epiproct (EP). Panama, Costa Rica ..... *microspina*

MAYA GROUP

Small species. Left tergal process (10 LP) flat, not folded downward on left side; only one talon on outer caudal angle. 10 RP very broad, caudally rounded; its slender talon's arcuation covers that of 10 RP's caudal margin. Cleft spiculation fine. Epiproct arc not developed. Gonapophysis "rods" (GO) present but only moderately sclerotized. Caudal margin of HP membranous, feebly bi-emarginated, weakly spiculated but lacking processes or lobes. One species collected in Honduras, Guatemala and Nicaragua, especially around Mayan archeological sites.

Chelicerca maya Ross

new species

(FIGURE 66)

Holotype.—Male, on slide, CAS. Data.—Nicaragua: 3 mi S Granada, 50 ft elev., matured in culture 17-XII-76 (E. S. Ross).

Description.—Appearance: Small, winged dark brown except for a reddish orange prothorax and partly yellowish antennae and forelegs. Color details (in alcohol): Cranium and eyes piceous black; antennal segment 1 reddish gold; flagellar segments 1–5 straw yellow, 6–14 (incomplete) grading to light brown. Prothorax and cervical sclerites reddish orange mottled on a creamy yellow color; prothoracic and cervical membranes creamy yellow; prothoracic coxae, trochanters, and femora reddish brown with tibiae and tarsi chocolate brown. Pterothorax and its legs chocolate brown with a faint metallic blue luster; pterothoracic membranes reddish purple. Abdomen similar to pterothorax but paler and more reddish; terminalia, including both cercus segments, darker, concolorous with pterothorax. Dimensions (on slide): Body length 5.7 mm; forewing length 3.5 mm, breadth 1.0 mm

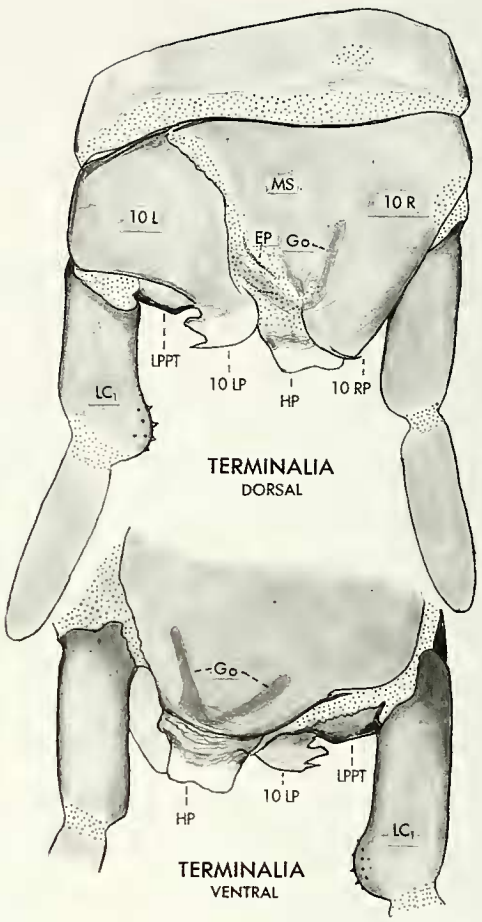

FIGURE 66. *Chelicerca maya* Ross, new species, holotype. Type locality: Nicaragua: Granada.

Anatomical distinctions.—As figured. Of special importance is the truncate, membranous, unlobed caudal margin of the hypandrium process.

Allotype.—Female, in alcohol, CAS, from type culture.

Description.—Cranium dark chocolate brown, golden around eyes; antennae entirely straw yellow, 17-segmented (complete). Body varied shades of golden tan, pleura medium brown; abdominal terg-

ites tinged with medium brown, darker caudad. Fore and mid femora and coxae straw yellow, tibiae medium brown. Hind legs almost entirely medium brown, femorotibial joints creamy white, tarsi straw yellow. Cerci golden tan, tips paler. Prothorax concolorous with remainder of thorax. Body length 8.5 mm.

Paratypes and parallotypes.—Numerous adults matured in type culture mostly during IV-VI-77. Deposited in CAS, USNM, INBO, and other institutions.

Additional records.—Guatemala: Quirigua (Mayan ruins), matured in culture 7-XII-76 (E. S. Ross). Guatemala: Tikal (bark of tree in Mayan ruins), matured in culture 22-XI-76 (E. S. Ross). Honduras: Copan, 2000 m elev., under stones and in tree bark in Mayan ruins, matured in culture XII-76 (E. S. Ross).

Discussion.—It is possible that wide distribution of this small species was due to precolumbian movements of Mayans. Some male specimens from Tikal have brownish instead of yellowish forelegs.

Chelicerca montazul Ross

new species

(FIGURE 67)

Holotype.—Male, on slide, CAS. Data.—Costa Rica: Montaña Azul, Heredia, 1500 m elev., 7-V-87 (E. S. Ross).

Description.—Appearance: Body slender, wings disproportionately large. Light brown except for pale yellow prothorax and all coxae, trochanters and femora. Cranium short behind eyes, caudally convergent, sides less than one eye-length. Eyes very large, interspace less than an eye-width. Basal two antennal segments dark brown, all others to apex light brown; 21 segments (complete). Forewing with six RA-RP cross-veins. Anterior margin of tergite 9 emarginated. Cleft membrane of tenth tergite with a patch of very fine, dense microspicules and irregular sclerites but no definite epiproct rim. 10 LP flat, short, abruptly tapered, terminated by a prominent, left-directed talon. 10 RP broad but short; its talon long, slender, arising on inner corner and very abruptly arced to right across apex of the broad, spatulate portion of 10 RP. Gonapophysis "rods" very slender, parallel-sided. HP small, irregularly arcuate caudally, lacking even a small trace of a talon. Dimensions (on slide): Body length 8.5 mm; forewing length 7.5 mm, breadth 2.0 mm.

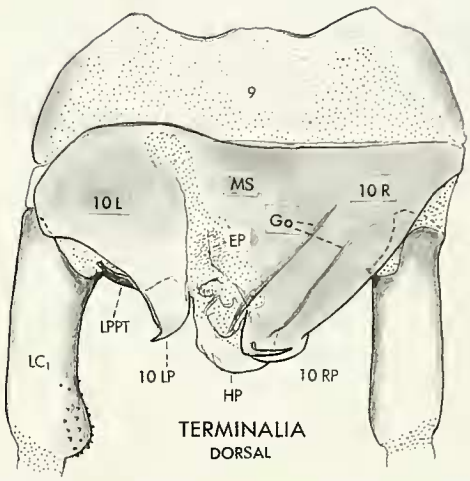

FIGURE 67. *Chelicerca montazul* Ross, new species, holotype. Type locality: Costa Rica: Montaña Azul, Heridia.

Female.—No specimen.

Paratypes.—None.

Discussion.—As figured, this species is readily distinguished by the peculiar details of the tenth tergal processes. The holotype was collected in bark of a stump in a dense, damp cloud forest.

RUFICOLLIS GROUP

Left tergal process (10 LP) flat, smooth, rarely folded down on its left side, with a single small point, or talon, usually on its left side. 10 RP broad, apically rounded or straight; talon varies from large, sickle-shape arising on left caudal margin to a minute point projecting from right caudal angle. Cleft membrane spiculate varying from fine to coarse; in some species clumped to form a sclerotic arc rimming the epiproct (EP). HP irregularly rounded, largely membranous except for a spine on right caudal corner, or on right side, this varying from conspicuous to almost dot-like (absent in one species). Gonapophysis "rods" usually well represented, sclerotic. LC_1 gradually dilated on inner side, the slight lobe coarsely echinulate. Species confined to Mesoamerica.

Chelicerca ruficollis (Saussure)

(FIGURE 68)

Embia ruficollis Saussure, 1896b:353.

Oligotoma ruficollis (Saussure) Krauss, 1911:42, pl. 2, fig. 10 (after Saussure).—Enderlein, 1912:91 (after Saussure).—Navás, 1924:62, fig. 4 (=*Saussurembia*

davisi Ross).—Friederichs, 1934:417, fig. 6 a-b (= *Saussurembia davisi*).

Saussurella ruficollis (Saussure) Davis, 1939b:573, figs. 1-4 (= *Saussurembia davisi*).

Saussurembia ruficollis (Saussure) Davis, 1940a:191 (= *Saussurembia davisi*).—Ross, 1944:435 (*ex parte Saussurembia davisi*).

Chelicerca ruficollis (Saussure), Ross 1992;128, fig. 9.6 (new combination).

Holotype.—Male, originally carded, now on microscope slide, deposited in Museum d'Histoire Naturelle, Geneva, Switzerland. Type labels.—"Bugaba, 800-1500 ft Champion," "*Embia ruficollis* Saus" (green card).

Locality interpretation.—In view of the great altitudinal range indicated on the type's label, "Bugaba" refers to the general Panamanian region of that name and not to the town Bugaba, Chiriqui, which is located at about 200 m elevation. At this time the type locality is fixed at 4 km S of Cerro Punta, Chiriqui, where I collected a specimen which closely resembles the holotype.

Description.—Appearance: Small, slender, winged (wings not unusually large); blackish brown except for contrasting golden yellow prothorax. forecoxae, trochanters, and femora. Color details (carded dry before slide preparation): Cranium dark mahogany brown, almost piceous, lacking pattern, clypeus blending to golden yellow at margins. Eyes piceous. Antennal segments 1 and 2 light brown, 3–14 tan, distals broken off. Labrum medium brown becoming golden yellow along lateral and apical margins. Pronotum reddish amber, caudal margin yellowish; remainder of prothorax, its coxae, trochanters, and femora also reddish amber. Remainder of specimen mahogany brown except for creamy yellow pigmentation in following regions: basal third of femora of mid-legs, basal half of hind femora, basal eighth of mid- and hind tibiae, the intersomital membranes of all abdominal somites except 9 and 10. Dimensions (on slide): Body length 8.2 mm; forewing length 6.2 mm, breadth 1.5 mm.

Anatomical distinctions.—As figured. The left tergal process (10 LP) was twisted on edge during

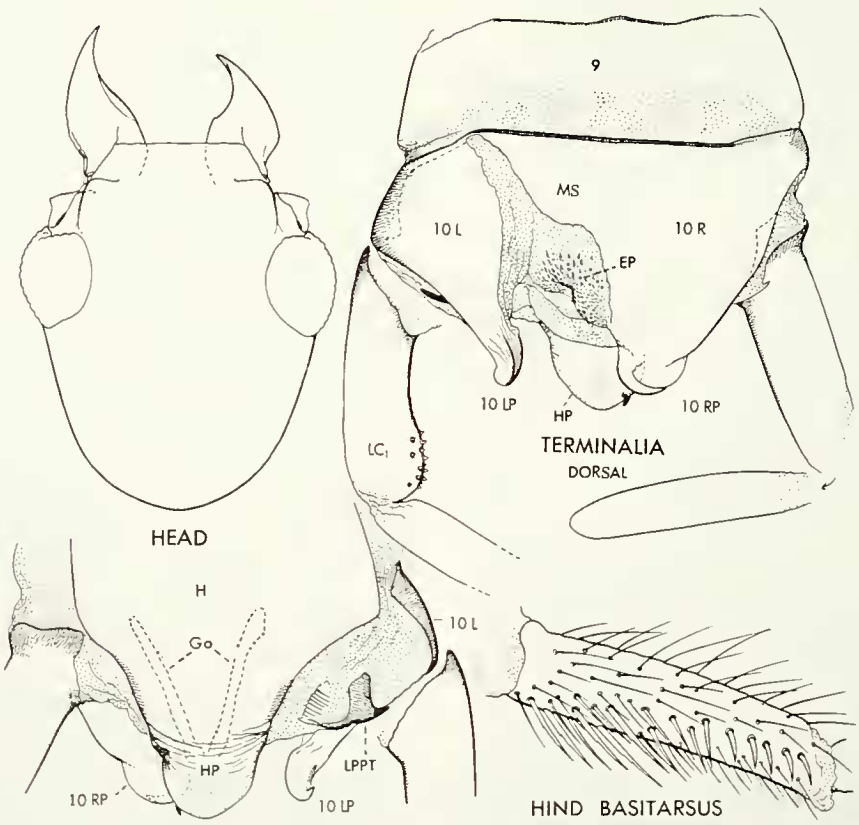

FIGURE 68. *Chelicerca ruficollis* (Saussure), type. Type labels: "Bugaba, 800–1500 ft Champion" (Panama).

slide preparation; the process actually is flat, spatulate with a small subapical point ("microtalon").

Female.—No specimens.

Discussion.—My only specimen of *C. ruficollis*, the basis of the present type locality fixation, is a male reared from a nymph collected 4 km S of Cerro Punta, Chiriqui, which matured 1-VI-75. When I returned to this region during January 1987, I expected to collect and culture a larger series but instead secured only the following species, *C. brunneicollis*. It is thus apparent that two distinct species of the Ruficollis Group can be sympatric and even occupy the same micro-habitat, i.e., mossy bark flakes of trees and logs in montane tropical forest.

Chelicerca brunneicollis Ross

(FIGURE 69)

Chelicerca brunneicollis Ross, 1992:129, fig. 9.7.

Holotype.—Male, on slide, CAS. Data.—Panama: 1 km S Cerro Punta, Chiriqui, 1700 m elev, matured in culture 8-II-87 (E. S. Ross).

Description.—Appearance: Moderately large, slender; wings exceptionally large, extending 3 mm beyond apex of terminalia; uniformly light brown, including prothoracic sclerites and legs, except for creamy white cervical and thoracic membranes. Color details (in alcohol): Cranium uniformly mahogany brown. Eyes dark lavender, tone similar to that of cranium. Antennal segment 1 mahogany brown, 2–3 light brown, 4–21 (complete) pale tan with rust red apices toward antennal apex. Mouthparts medium brown. Cervical and prothoracic sclerites medium brown, pronotum pale yellow caudally; cervical and prothoracic membranes creamy white, folds tinged with rust. Pterothoracic sclerites lighter brown; membranes creamy white, tinged laterally with rust brown. All leg segments uniformly reddish brown, forelegs slightly darker, hind femora becoming whitish basad. Wing bands very pale brown, sclerotized veins and radius marginal lines very faintly granular brick red (brightly so in other species). Abdomen, except terminalia, basically yellowish tan but heavily, subcutaneously mottled with rust red; sterna uniformly yellowish tan; sclerotic portions of terminalia glossy mahogany brown, apices of tergal processes amber, basal cercus segments mahogany brown, apical segments slightly paler. Dimensions (on slide): Body length 9.5 mm; forewing length 8.4 mm, breadth 2.3 mm.

Anatomical distinctions.—As figured.

Allotype.—Female, in alcohol, CAS, with holotype data.

Description.—Cranium dull jet black, surface

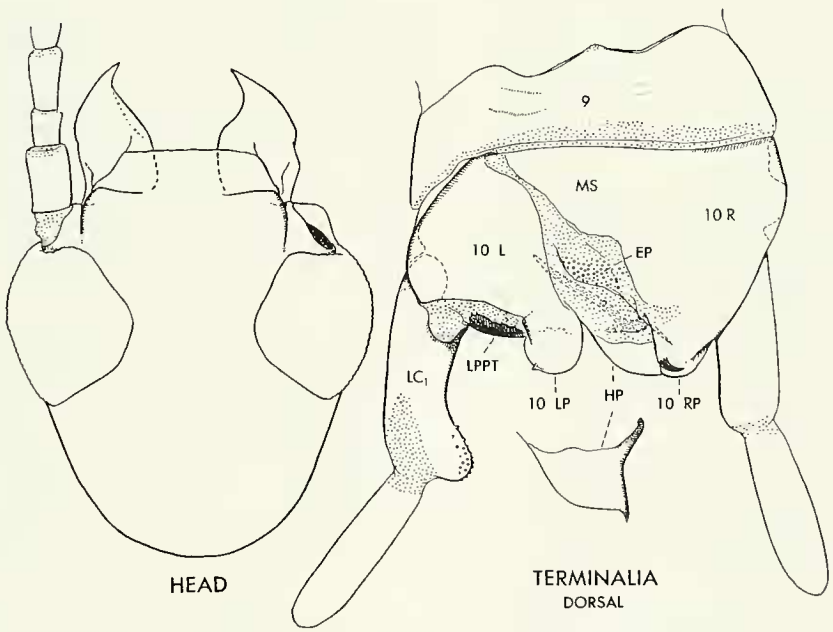

FIGURE 69. *Chelicerca brunneicollis* Ross, holotype. Type locality: Panama: Cerro Punta, Chiriqui.

finely alutaceous, lacking pattern. Eyes grayish black. Antennal segments 1–3 dark brown, 4 tan, all others yellowish, those of distal fifth becoming tan; complete antenna 21-segmented. Cervical membranes creamy yellow tinged with pink; sclerites dark brown. Prothoracic sclerites mahogany brown, membranes tan. Acrotergite transparent, thus revealing lemon yellow color of internal fatty tissue. Meso- and meta-nota of thorax piceous black, blending to brick red anteriorly; membranous areas rust red. Legs varied shades of mahogany brown. Terga of abdominal somites 1–4 basically rust red, mottled with dark brown; pleurites and associated membranous areas rust red, intersegmental membranes and caudal margins of terga creamy yellow; caudal half of abdomen blending to piceous black. Basal segments of cerci rust red, inner margins and distal segments dark brown. Body length 10.5 mm.

Paratypes and parallotypes.—Topotypic adults from holotype's culture and a series from a culture obtained at Volcan, Chiriqui, 1300 m elev., in bark and bases of cypress trees in gardens, deposited in CAS, BMNH, MIUP, INBIO, and USNM.

Additional records.—South slope Volcan Baru, 1600 m elev., colonies in leaf litter of virgin oak forest, especially beneath fallen dead limbs; and a colony on undersurface of dead limb on ground in mountain forest at 1300 m level. One damaged male, "Fortuna," Chiriqui 10-V-77. (J. Choe).

Discussion.—The type culture was assembled from individuals webbing bark crevices of small trees in a limited, residual patch of natural forest. Reared adults, including those from Volcan and Volcan Baru, show no variation in species-defining characters. The exceptionally large wings and slender body proportions characterizing this species tend to occur in many unrelated taxa found in damp, high-altitude habitats throughout the tropics. The very large eyes separated by less than one eye-width and longer than cranial sides are also distingtuishing features found in no other species of the *Ruficollis* Group.

Chelicerca microspina Ross

(FIGURE 70)

Chelicerca microspina Ross, 1992:131, fig. 9.8.

Holotype.—Male, on slide, CAS. Data.—Panama: Barro Colorado Island, Gatun Lake, 24-VII-63 (M. Irwin and D. Q. Cavagnaro).

Name basis.—Refers to unusually small spine on caudal corner of the right tergal process.

Description.—Appearance: Size, coloration and wing length similar to *C. ruficollis*. Color details (in alcohol): Cranium mahogany brown, without pattern. Eyes dark lavender. Antennae and mouthparts medium brown, membranes pale. Prothoracic and cervical sclerites clear amber, membranous areas creamy white due to internal tissue; forelegs basally yellowish brown, blending distally to mahogany brown. Pterothoracic sclerites light mahogany brown, membranes pale tan; mid- and hind legs medium brown, trochanters and bases of femora pale tan. Abdominal somites basically pale brown, interscleratal membranes creamy white creating a banded appearance; terga and sterna mottled laterally with rust brown; terminalia darker brown, left membrane whitish, left process amber. Dimensions (on slide): Body length 7.75 mm; forewing length 6.6 mm, breadth 1.3 mm.

Anatomical distinctions.—Cranium and eyes as in *C. ruficollis*. Antennal segments rather short, 18 in complete antenna. Terminalia, as figured: spiculated area (EP) in cleft pigmented, forming a distinct spot; left process (10 LP) abruptly turned 90 degrees to left; talon of right process very small, located toward right side of process (10 RP).

Female.—No specimens.

Discussion.—Despite careful search, I was unable to find colonies of this species on Barro Colorado Island. Two populations occurring in Costa Rica also have a minute, triangular spine (not a curved talon) on the right, caudal corner of 10 RP. They probably represent distinct species, but I will not name and describe them at this time.

One such population was collected by me in road bank crevices in cleared pasture slopes below Monteverde, Costa Rica at 4500 ft elev. Another series was cultured from stock collected by David Cavagnaro at Turrialba, Costa Rica. Both series have characters shared with *C. microspina*, such as a minute, triangular spine on the outer caudal corner of 10 RP.

Chelicerca villaneillya Ross

new species

Holotype.—Male, on slide, CAS. Data.—Costa Rica: 2 km N Villa Neilly, 50 ft elev, 28-IX-76 (E. S. Ross).

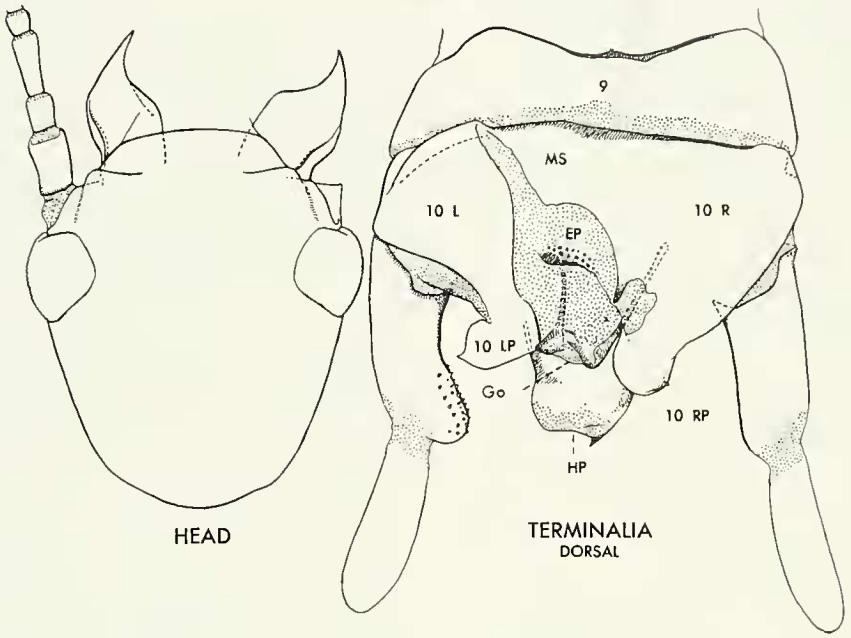

FIGURE 70. *Chelicerca microspina* Ross, holotype. Type locality: Panama: Gatun Lake.

Description.—Cranium chocolate brown, eyes black; basal antennal segment golden brown, other segments yellowish tan. Prothoracic and cervical sclerites pale amber, membranous areas creamy white. Pterothoracic sclerites dark amber, sutures piceous. All legs varied shades of dark amber. Sclerotized portions of abdomen medium brown, membranous areas creamy white; terminalia medium brown, distal cercus segments white. Dimensions (on slide): Body length 6.5 mm; forewing length 4.6 mm, breadth 1.2 mm.

Anatomical distinctions.—Eyes rather small, interspace two eye-widths. Antennae 18-segmented (complete). Wings with three RA-RP cross-veins. Terminalia as figured. Tenth tergal cleft with only a few spiculations in a narrow, transverse patch; epiproct margin not sclerotized; 10 LP broad, flat, talon minute, on extreme outer apical corner; 10 RP talon slender evenly, not abruptly arcuate; hypandrium process extensively membranous; talon very small, almost obsolete.

Allotype.—Female in alcohol, from holotype's culture.

Description.—Cranium golden brown, vertex between eyes dark amber (pale due to white brain visible through integument); antennae entirely creamy white. Thoracic sclerites, especially meso- and metanota, and basal portions of legs pale amber, extremities of legs medium brown. Abdomen having a distinct annulate appearance due to medium brown terga separated by broad, creamy white, membranous, intersomital bands; paraprocts and cerci pale tan. Body length 8.0 mm.

Paratypes and parallotypes.—Numerous adults from holotype's culture deposited in CAS, INBIO, USNM, BMNH and potentially other institutions.

Discussion.—This species differs from its relative, *C. ruficollis* by its much smaller size and paler coloration, larger and less bulbous eyes, reduced spiculation in the tenth tergite's cleft, less sclerotized hypandrium lobe with an almost obsolete talon.

Chelicerca inbio Ross

new species

Holotype.—Male, on slide, CAS. Data.—Costa Rica: Parque Nacional, San Jose, matured in culture 21-X-76 (E. S. Ross). Colonies common on bark of planted trees in a public park.

Name basis.—The acronym for the Instituto Nacional de Biodiversidad, San Jose, Costa Rica.

Description.—Closely resembles *C. ruficollis* (as figured), differs as follows: Generally paler brown in color; eyes slightly larger, not as bulging; wings with fewer RA-RP cross-veins, only two instead of four; anterior margin of tergite 9 bi-emarginate instead of almost straight; 10 LP flat, its talon directed straight outward, instead of curved forward; epiproct margin sclerotized, instead of non-sclerotized; 10 RP talon as in figure of holotype of *C. ruficollis* (in my specimen of *C. ruficollis* the talon is abruptly hooked forward); left cercus lobe more extensive, instead of smaller and rounded. Dimensions slightly smaller than *C. ruficollis*.

Paratypes.—Numerous adult males from holotype's culture deposited in CAS, INBIO, USNM and BMNH.

Chelicerca auricollis Ross

Chelicerca auricollis Ross, 1992:130.

Holotype.—Male, on slide, CAS. Data.—Panama: La Mesa, above El Valle, Cocle, 1200 m elev., matured in culture 24-III-87 (E. S. Ross).

Description.—Appearance: Medium sized, slender; wings normal in length, not extending beyond apex of abdomen; multicolored, head dark brown, antennae pale, prothorax golden yellow, body and legs reddish brown except for partially yellow femora. Color details (in alcohol): Cranium uniformly dull, dark mahogany brown dorsally, lacking pattern; gula yellow. Eyes dark grayish lavender, lighter than cranium. Antennal segment 1 medium brown, 2–8 whitish, 9–12 becoming light brown with pink membranes. Cervical and prothoracic sclerites yellowish, pronotum and pleura tinged with rust red, caudal angles of pronotum pale yellow; membranous areas creamy white. Pterothoracic sclerites shades of medium brown, tinged with rust red. All leg segments reddish brown except for yellowish basal two-thirds of femora, foretibiae and tarsi darkest. Wings with radius margin lines strongly salmon pink. Abdomen subcutaneously rust red except for creamy white intersomital bands; sclerotic portions of terminalia and cerci mahogany brown, tergal processes entirely mahogany brown. Dimensions (on slide): Body length 8.5 mm; forewing length 6.5 mm, breadth 1.75 mm.

Allotype.—Female, CAS, in alcohol, with holotype data. Cranium dull piceous brown, surface finely alutaceous, lacking pattern; paler ventrally. Eyes jet black. Antennal segment 2 golden brown; others pale amber, becoming slightly darker distally. Cervical and prothoracic sclerites yellowish amber; pronotum orange due to light brown tinge on an amber base; membranes yellowish white. Mesonotum dull mahogany brown, yellowish in caudal fifth; metanotum, reddish brown, yellowish in caudal third; ventral pigmentation similar. All coxae reddish brown: trochanters yellowish, fore trochanters slightly darker; femora yellowish, becoming reddish brown distally; all trochanters reddish brown. Abdominal segments 1–3 subcutaneously rust brown, 4–10 becoming very dark mahogany brown; paraprocts reddish brown; basal segments of cerci mahogany brown, distals reddish brown becoming paler at extreme apices. Body length 11.0 mm.

Paratypes and parallotypes.—Topotypic adults in CAS, BMNH, MIUP, USNM, and INBIO.

Discussion.—Colonies of this species are abundant in mossy bark of large trees in the vicinity of buildings at the crest of the road above El Valle. They were not found on trees in the adjacent cloud forest but this may have been due to the density and profusion of epiphytic growth.

Cranial and eye characters of males are very similar to those of *C. brunneicollis*, but body size and wing proportions are similar to those of *C. ruficollis*. The multicolored body and legs are also distinct from the uniform brown of *C. brunneicollis*.

Chelicerca paraisoa Ross

new species

(FIGURE 71)

Holotype.—Male, on slide, CAS. Data.—Costa Rica: 6 mi E Paraiso, 4400 ft elev., matured in culture 26-X-76 (E. S. Ross).

Description.—Appearance: Moderately large, slender with especially large wings; body and legs golden tan. Cranium narrow behind eyes, sides one eye-length; eyes large, globose, interspace one eye-width, coarsely faceted, color grayish black in contrast to mahogany brown cranium. Basal antennal segment golden tan, all others pale yellow becoming tan distad, 21-segmented (complete). Thoracic sclerites and legs yellowish tan, membranes dark creamy white tinged with pink. Abdomen yellow tan with terga increasingly dark caudad due to subcutaneous rust brown mottling; terminalia's sclerotic areas, including entire cerci, golden brown. Dimen-

sions (on slide): Body length 8.5 mm; forewing length 6.75 mm; breadth 1.75 mm.

Anatomical distinctions.—The slender body with large wings; narrow cranium with globose, large eyes. Terminalia with dense spiculation and narrow sclerotization of EP's margin in tenth tergite's cleft; talon of 10 LP blunt; inner margin of 10 RP straight, abruptly angled at 90° toward right and continued as a non-arcuate talon. Gonapophisis "rods" especially large. Caudal half of HP membranous, its minute talon located on right corner.

Female.—No specimens.

Paratypes.—Three topotypic males and one from 9 km E Paraiso, Cartago, Costa Rica, 1340 m elev., 23-IX-76 (E. S. Ross), deposited in CAS.

Habitat.—Cultures were collected on stumps in low forest.

Chelicerca matagalpae Ross

new species

(FIGURE 72)

Holotype.—Male, on slide, CAS. Data.—Nicaragua: Santa Marta, 5 mi N Matagalpa, 4200 ft elev., matured in culture 7-X-76 (E. S. Ross).

Description.—Cranium mahogany brown, eyes black. Antennal segments uniformly medium brown, 18-segmented (complete). Prothoracic and cervical sclerites lemon yellow, adjacent membranes creamy white. Pterothoracic sclerites varied shades of golden brown. All leg segments lemon yellow, except for medium brown foretibiae and tarsi. Abdomen increasingly medium brown caudad, all membranes pale tan; sclerotic portions of terminalia and entire cerci medium mahogany brown. Dimensions (on slide): Body length 8.0 mm; forewing length 6.0 mm, breadth 1.5 mm.

Anatomical distinctions.—Cranium narrow, eyes moderately large, interspace one and one-half eyewidths. Terminalia's cleft with dense microspicules but no marginal epiproct sclerotization; 10 LP flat, golden yellow extensively projected leftward; 10 RP narrow, talon broad-based, triangular, not arcuate. Gonapophysis "rods" very large. HP extensively projected caudad beyond 10 LP, its talon on right corner conspicuous.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Cranium mahogany brown, eyes with paler outline; antennae pale lemon yellow, apical segment medium brown, 19-segmented (complete). Prothoracic and cervical sclerites orange, adjacent membranes creamy yellow. First acrotergite creamy white; mesonotum and lateral sclerites mahogany brown, adjacent membranes dark lavender;

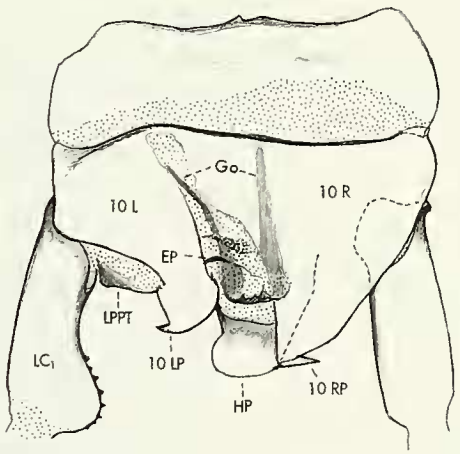

FIGURE 71. *Chelicerca paraisoa* Ross, new species, holotype. Type locality: Costa Rico: 6 mi E Paraiso.

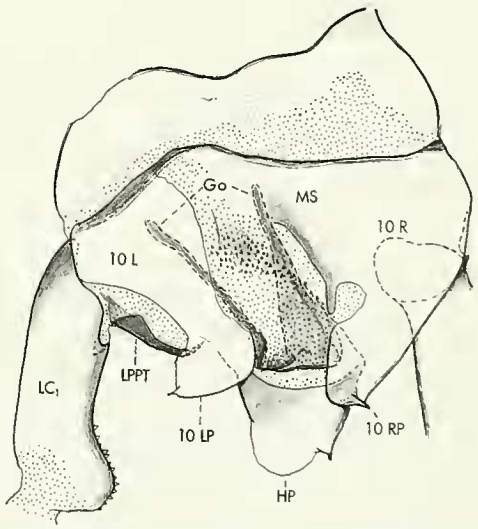

FIGURE 72. *Chelicerca matagalpae* Ross, new species, holotype. Type locality: Nicaragua: 5 mi N Matagalpa.

metanotum dark yellowish amber clouded with medium brown, pleurites amber. Coxae and trochanters of fore- and mid-legs straw yellow, tibiae dark yellowish amber, tarsi darker; hind legs similar but overall darker in color. First abdominal tergite yellow clouded with light brown; other tergites and all sternites mahogany brown, darkest caudad; paraprocts and cerci medium brown; intersomital membranes narrowly dark creamy white, resulting in a banded appearance. Body length 9.5 mm.

Paratypes.—Six adult males from holotype's culture deposited in CAS and INBIO.

Discussion.—Terminalia characters, as figured, as well as the female's coloration aid recognition of this species.

ESTELI GROUP

Left tergal process (10 LP) thick, grooved on outer side; talon prominent, located on outer caudal margin. Apex of 10 RP narrowed, its slender talon arises on extreme outer corner from a membranous base and immediately turns basad, not overlapping apex of the process. Spiculation in cleft extensive, unusually dark and dense. Sclerotic arc of epiproct not developed. Gonapophysis "rods" (GO) especially large, darkly sclerotic. Caudal rim of HP darkly sclerotic, extended on dorsum, caudal edge bearing a lobe, slanted toward right, with two closely approximated, non-spiculated nodules. One species collected to date in Nicaragua.

Chelicerca esteli Ross

new species

(FIGURE 73)

Holotype.—Male, on slide, CAS. Data.—Nicaragua: 7 mi NW Esteli, 2800 ft elev., matured in culture 7-XII-76 (E. S. Ross).

Name basis.—Name of type locality.

Description.—Alate, overall darkly melanized, except as follows: Antennae yellowish tan in basal half gradually becoming medium brown distad, 19-segmented (complete); prothorax and cervix entirely golden yellow, fore coxae and trochanters concolorous, femora yellowish tan, tibiae and tarsi chocolate brown; pterothorax and its legs chocolate brown; abdomen paler, especially because of its golden tan unsclerotized portions; terminalia chocolate brown except for yellowish tan cercus apices.

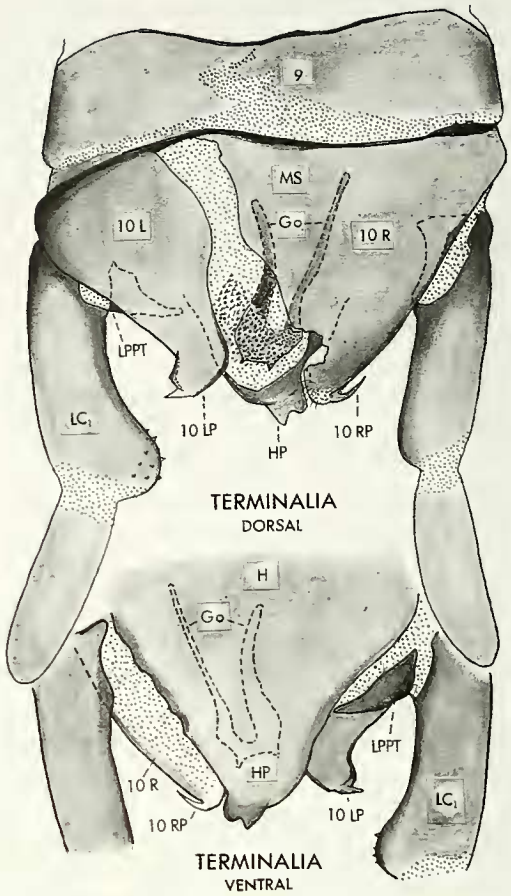

FIGURE 73. *Chelicerca esteli* Ross, new species, holotype. Type locality: Nicaragua: 7 mi NW Esteli.

Dimensions (on slide): Body length 6.5 mm; forewing length 4.4 mm, breadth 1.2 mm.

Anatomical distinctions.—Outlined as Group characters and figured. The head (not figured) is oval with small eyes separated by a 3 eye-width interspace.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Coloration similar to males. Acrotergite 1 lemon yellow; acrotergite 2, prescutum, and surrounding membranes likewise yellowish, creating a broad pale band between meso- and metathorax; narrow whitish bands between abdominal somites intensify the banded appearance of the female. All tarsi and cerci yellowish. Body length 10 mm.

Paratypes and parallotypes.—Numerous adults deposited in CAS, USNM, BMNH, INBIO, and potentially other institutions.

Discussion.—Culture stock was collected in crevices of dry bark of a limb. Males are distinct (as figured) in the shape of the tenth tergal process; 10 RP is unique in its membranous apex and the narrow talon which arises on the right corner and abruptly projects forward, not overlapping the apex of the process. The tergal cleft has an extensive microspiculate area but the apex of the epiproct isn't sclerotized. The caudal margin of HP is unique in its right-slanted lobe with two small non-spiculate nodules. The gonapophysis "rods" are especially large and heavily sclerotized.

YOJOA GROUP

Left tergal process (10 LP) very broad, short, outer base coarsely rugulose, its micro-talon located next to this area. Right process (10 RP) broadly truncate, its talon short, broad-based, triangular. Hypandrium process sclerotized, its caudal rim with an acute spine abruptly projected leftward. The Group comprises only the following species from Honduras.

Chelicerca yojoa Ross
new species
(FIGURE 74)

Holotype.—Male, on slide, CAS. Data.—Honduras: 2 mi NE Lago de Yojoa, 2000 ft elev., matured in culture 3-II-77 (E. S. Ross).

Description.—Multicolored, cranium blackish brown, eyes black; antennal segment 1 mahogany brown, segment 2 orange, other segments at first lemon yellow, grading to light brown distad, 16-segmented (complete). Prothoracic sclerites, yellowish amber; surrounding membranes white due to color of internal tissue. Pterothoracic and abdominal sclerites mahogany brown, membranous areas tan; all legs entirely mahogany brown. Terminalia glossy dark mahogany brown; apex of 10 RP golden brown and microhirsute on inner arc; membranous areas whitish tan; cerci varied shades of mahogany brown, tips of apical segments tan.

Anatomical distinctions.—Eyes relatively small, interspace 4 eye-widths. Cleft spicules minute but two clumps form narrow, transverse sclerites (EP). 10 LP very broad, left base rugose, darkly sclerotic,

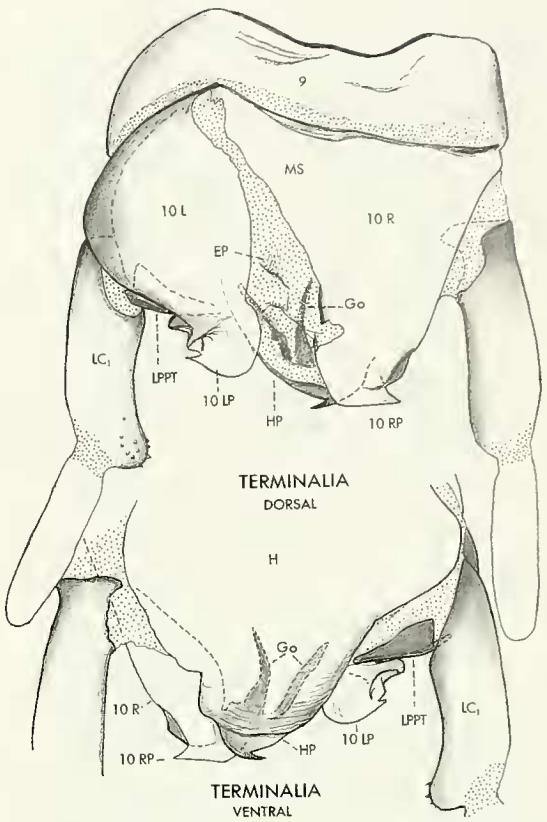

FIGURE 74. *Chelicerca yojoa* Ross, new species, holotype. Type locality: Honduras: Lago de Yojoa.

outer apical angle translucent amber bearing a minute talon. 10 RP apically truncate, translucent amber, extended toward right as a triangular point; inner margin brown, microrugose and microhirsute. HP darkly sclerotized, margin with and abruptly left-slanted acute spine. Gonapophysis "rods" (GO) very large, darkly sclerotic. Inner-apex of LC_1 feebly lobed, bearing only a few coarse echinulations. Dimensions (on slide): Body length 6.5 mm; forewing length 4.2 mm, breadth 1.0 mm.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Multicolored. Cranium chestnut brown, darker anteriorly; eyes black. Antennal segment 1 golden amber, all other segments lemon yellow. Prothoracic sclerites golden amber, pronotum clouded with light brown medially; associated membranes grayish white; acrotergite 1 pale lemon yellow. Mesonotum light mahogany brown in anterior half, grading to lemon yellow caudad; acrotergite 2 and prescutum lemon yellow, adjacent membranes

grayish white thus forming a pale intersomital band. Metanotum similar but pale caudal area is short. Pleural sclerites of thorax and legs mahogany brown, forelegs paler. Abdominal sclerites mottled light mahogany brown intervening pale, dorsal, intersomital membranes especially broad creating conspicuous banding. Cerci light brown, basal segments darker. Body length 8.0 mm.

Paratypes and parallotypes.—Adults from holotype's culture deposited in CAS, USNM, and INBIO.

Discussion.—Stock of the type culture was collected in bark of stump in a natural forest along road on the east side of Lago de Yajoa. The species is very distinct, especially in the structure of the tergal processes. Most unusual is the microrugose, microhirsute inner corner of 10 RP. The prominent acute spine on HP is also distinctive.

ALPINA GROUP

Left tergal process (10 LP) simple, without talon. Talon of 10 RP, slender, arcuate, arising on inner-caudal corner. Epiproct (EP) arc only moderately sclerotized. Gonapophysis "rods" weak. Caudal portion of HP evenly tapered forming a conical point, membranous at its tip. Two highland species, one in El Salvador, the other in Guatemala.

Chelicerca alpina Ross

new species

(FIGURE 75)

Holotype.—Male, on slide, CAS. Data.—El Salvador: Cerro Verde, 6100 ft elev., matured in culture C-654, 13-XII-76 (E. S. Ross).

Name basis.—Refers to high altitude of type locality.

Description.—Appearance: Medium sized, alate; bicolorous, head and body largely dark brown, antennae prothorax, and all legs varied shades of pale yellow and tan. Color details (in alcohol): Cranium dull blackish brown, eyes black; basal antennal segments (1–5) pale yellow, others blending to medium brown, 20 segments (complete). Prothoracic sclerites medium brown, membranes yellow; forecoxae and foretarsi golden brown, legs otherwise yellow. Pterothorax largely mahogany brown; coloration of its legs similar to that of forelegs; wing veins pale yellow, RBS tan, its borders and cross-veins white.

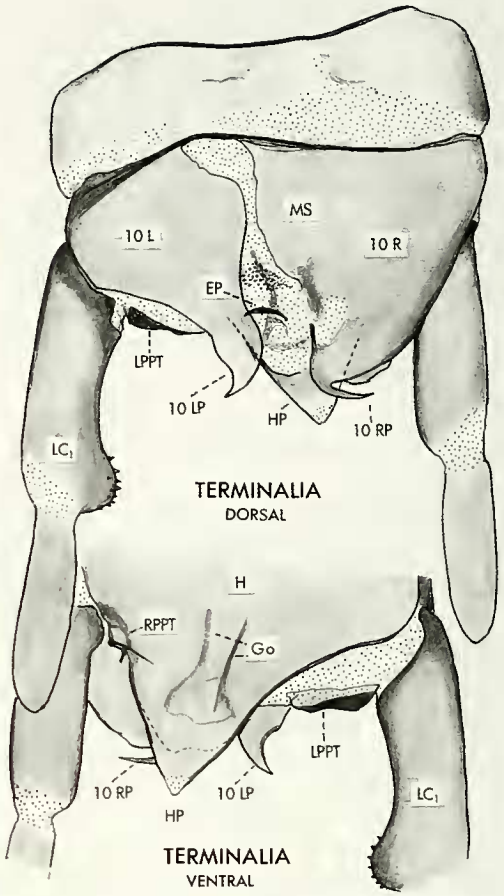

FIGURE 75. *Chelicerca alpina* Ross, new species, holotype. Type locality: El Salvador: Cerro Verde.

Abdomen mostly pale tan, extensively tinged with rust brown; terminalia mahogany brown except for reddish brown basal cercus segments and yellowish tan distal segments. Dimensions: Body length 8.0 mm; forewing length 5.0 mm, breadth 1.2 mm.

Anatomical distinctions.—The narrowly tapered apex of 10 LP and the broad HP with a slender, long talon which doesn't cross the apex of HP.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Generally dark mahogany brown, eyes black. All antennal segments yellow. Prothoracic sclerites and forelegs entirely mahogany brown, associated membranes yellowish tan; acrotergite 1

translucent amber, surrounding membranes pale tan. All other body sclerites and legs mahogany brown, tan membranes between abdominal terga create a banded appearance. Basal cercus segments mottled mahogany brown apical segments golden brown. Body length: 10.5 mm.

Paratypes and parallotypes.—Numerous adults reared in type culture. Deposited in CAS, USNM, INBIO, and other institutions.

Additional record.—Series from Cerro Verde at 6000 ft elev. (D. Q. Cavagnaro). Males of this series are also designated paratypes.

Chelicerca guatemalae Ross
new species
(FIGURE 76)

Holotype.—Male, on slide, CAS. Data.—Guatemala: Bosque Rotario, 6 km E Antigua, 6000 ft elev., matured in culture 24-I-77 (E. S. Ross).

Description.—Appearance: Medium sized, alate; bicolorous, color details as described for *C. alpina* but with paler portions a tone darker (more golden instead of yellow); basal and distal segments of cerci dark brown. Dimensions: Body length 8.0 mm; forewing length 5.5 mm, breadth 1.4 mm.

Anatomical distinctions..—As figured. Differs from *C. alpina* in the broader 10 LP which is caudally arcuated, not acutely tapered. The talon of 10 RP is shorter and closely aligned with the apex of 10 RP.

Allotype.—Female, in alcohol, CAS, Data.—From holotype's culture.

Description.—Head, and body sclerites blackish brown, rather dull. Antennae yellowish tan except basal and apical light brown segments; 18 segments (complete). Cervical membranes rust brown; acrotergite 1 largely pale yellow and tan, forming an intersomital band; acrotergite 2 light brown. All leg segments dark mahogany brown. Pleural membranes of abdominal segments 1–8 white; intertergal membranes narrowly tan, thus forming transverse bands. Cerci entirely light mahogany brown, including membranes. Body length: 10.5 mm.

Paratypes and parallotypes.—Five adult males and numerous adult females, CAS, from holotype's culture. Males matured during January and February.

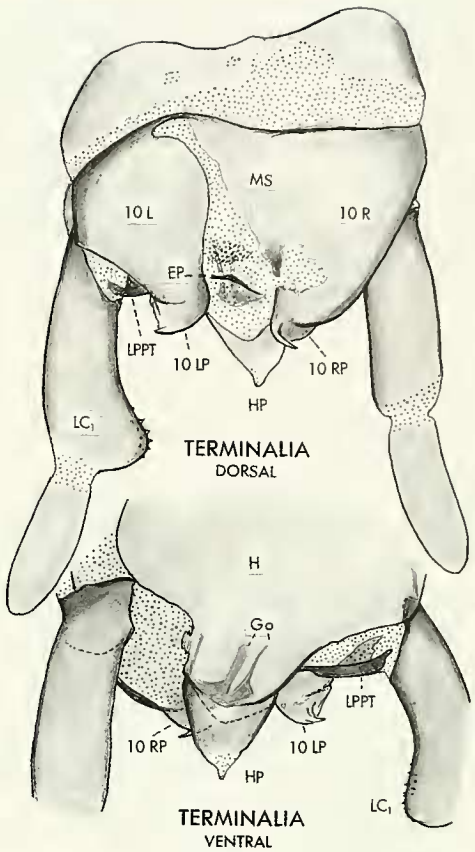

FIGURE 76. *Chelicerca guatemalae* Ross, new species, holotype. Type locality: Guatemala: 6 km E of Antigua.

Habitat.—Females, with their first and second instar broods occurred in splintered saplings in semicleared, natural, mountain forest 16-X-76. These matured during I and II-77. The culture didn't thrive.

CHELICERCINAE OF SOUTH AMERICA

The genus *Chelicerca* is richly represented in South America, especially in the Andean region. At this time, however, only some of the many new species I have collected and cultured are treated. Surprisingly, none of the species are closely related to those occurring north of the Isthmus of Darien. It should be noted, however, that no embiids have been collected in this region, or in northwestern Colombia. No chelicerines have been collected in the West Indies. As is to be expected, species occurring on

Trinidad and Tobago are related to those of the adjacent mainland.

South American *Chelicerca* have diverse terminalia characters and, as more species are collected and studied, the Species-Groups here tentatively defined may be confirmed. Later it may be decided that some are subgenera, or genera. At present, only obvious characters are used. Future studies should reveal many additional distinctions visible only in carefully made slide preparations and in large series of specimens. This statement, of course, applies to any other taxonomic group of the order.

At this time it would be difficult, if not impossible, to develop a meaningful classification of *Chelicerca*. In effect, most species can be likened to disconnected twigs of a tree.

KEY TO SOUTH AMERICAN SPECIES OF *CHELICERCA*

1. Distal segment of left cercus absorbed (fused) into the basal segment 2
— Distal segment distinctly separated (articulated) from the basal segment 4
2. Small, apterous Galapagos species ..... *galapagensis*
— Larger, alate, mainland species 3
3. Inner corner of 10 LP without microspiculation; caudal margin of HP with an elongate, very slender process. Central Ecuadorian Andes ..... *monticola*
— Inner corner of 10 RP densely microspiculated; caudal margin of HP with only a tiny, short process. Northern Peruvian Andes ..... *spiculata*
4. Caudal margin of T-9 with two extensive apodemes; inner corner of 10 LP extensively produced mesad; talon of 10 RP arising on inner basal margin of 10 RP; thence projected straight caudad. Basal segment of left cercus large, stout, not distinctly lobed. Argentina ..... *barbara*
— Caudal margin of T-9 without distinct apodemes; inner corner of 10 LP not extensively produced mesad; 10 RP talon usually originating mesad on the process, or on its outer margin, and directed toward right. Basal segment of left cercus often slender and definitely lobed. Widespread in South America 5
5. Surface of 10 LP flat (horizontal), without microspiculation 6
— Left side of 10 LP abruptly folded ventrad, this surface often concave and complex; inner corner often microspiculated 9
6. Tooth on 10 LP minute, centered on caudal margin; apex of 10 RP with two minute talons. Rondônia, Brazil ..... *rondonia*
— Tooth on 10 LP conspicuous, located on left corner; apex of 10 RP with a single, usually small, short talon 7
7. Distal segments of cerci and apices of the basal segments, unsclerotized, white. Colombia ..... *minuta*
— Cercus segments equally sclerotized, brown 8
8. Outer basal portion of mandibles acutely projected. Left corner of 10 LP deeply notched; talon of 10 RP conspicuous. Colombia .. *acuta*
— Outer basal portion of mandibles rounded. Left corner of 10 LP not notched, its talon minute; talon of 10 RP extremely minute. Rio de Janeiro ..... *rioensis*
9. Caudal margin of HP medially extended as a flat, spatulate, thin lobe which bears a minute spine. SW Ecuadorian lowlands ..... *spathula*
— Caudal margin of HP without a spatulate medial lobe 10
10. Caudal portion of HP heavily sclerotized, bearing a large, sclerotic, left-directed process. Andean highlands of N Peru and central Ecuador ..... *andesina*
— Caudal portion of HP mostly unsclerotized, without a distinct process 11
11. Outer basal area of mandibles acutely produced. Basal segment of left cercus elongate, tubular, abruptly lobed. Argentina ..... *tigre*
— Outer basal area of mandibles rounded. Basal segment of left cercus stout unlobed or gradually lobed. Western South America 12
12. Outer apex of 10 LP complex, bearing a ventral hook; talon of 10 RP especially large, slender, extended across rounded apex of the process. Basal segment of left cercus not definitely lobed, distal segment short. Coastal loma zone of Peru, extending up into Andes of Peru and Ecuador ..... *loma*

— Outer apex of 10 LP relatively simple, smooth-surfaced, without a ventral hook; talon of 10 RP very small, short. Basal segment of left cercus with a large apical lobe; distal segment elongate, narrowly articulated. S Ecuadorian cloud forest ..... *nimba*

MINUTA GROUP

Left mandible without medial flange, molar cusp of right mandible not projected; outer basal corners either rounded or angulate. Bases of T-9 and 10 straight, without apodemes. Left tergal process (10 LP) folded down, with a ventral hook. Right process (10 RP) short; its talon arising on tip of the process, very short. Hypandrium process (HP) tapered caudad, terminated as membranous nipple; sides of process, especially the left, curved dorsad, forming a trough. Cleft membrane with almost invisible spiculation; epiproct and gonapophysis "rods" not apparent. Basal segment of left cercus stout, expanded mesocaudad to form a prominent echinulate lobe.

This promises to be a large group, as evidenced by many, often weakly defined, new species occurring along the Andes and elsewhere. It is possible that *Chelicerca* assigned to other groups in this treatment, must be placed in this group.

Chelicerca minuta is the only known South American *Chelicerca* with white distal cercus segments.

Chelicerca minuta (Ross)

new combination

(FIGURE 77)

Schizembia minuta Ross, 1944:443, figs. 70–72.

Holotype.—Male, on slide, USNM. Data.—Colombia: In shipment of *Cattleya* orchids originating at Medellin. Intercepted in plant quarantine in Hoboken, New Jersey, 15-X-41.

Remarks.—I have collected and cultured extensive series of this species from southern Colombia northward into the coffee growing regions of the Cauca and Magdalena River valleys. Colonies occur under bark flakes of trees and fence posts and also amongst moss and lichens growing on rocks on open hillsides. It can readily be recognized by its basally pale mid- and hind femora and that of the distal cercus segments.

GALAPAGENSIS GROUP

Males apterous. Mandibles without outer basal projections, left mandible with a low projection on medial flange. Cleft without microspiculation or a defined epiproct margin; gonapophysis "rods" (GO) very weak, almost invisible. Left tergal process (10 LP) with outer margin folded ventrad, a minute hook present on its ventral basal margin. Right process (10 RP) broad, its talon short, arising medially on the process. Hypandrium process (HP) caudally tapered, without a distinct process, left margin elevated. Cerci short, the left one-segmented.

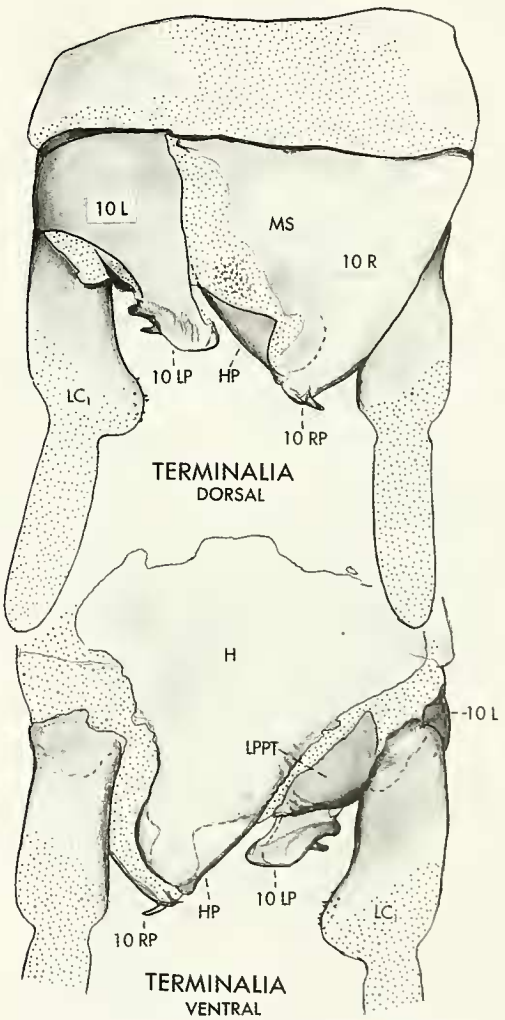

FIGURE 77. *Chelicerca minuta* (Ross), terminalia of a male from Salado, W of Cali, Colombia. Type locality: Probably near Medellín, Colombia.

Distribution.—Higher zones of larger Galapagos Islands.

Chelicerca galapagensis Ross

(FIGURE 78)

Chelicerca galapagensis Ross, 1966:501, fig. 1.

Holotype.—Male, on slide, CAS. Data.—Galápagos: Duncan Island (Isla Pinzón), 1300 ft elev., matured in culture 22-IV-64 (D. Q. Cavagnaro).

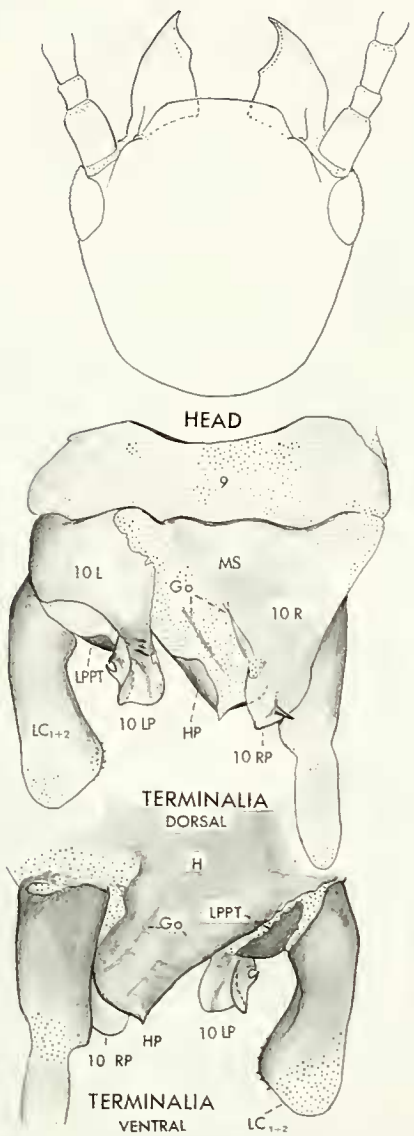

FIGURE 78. *Chelicerca galapagenses* Ross, holotype. Type locality: Galapagos: Duncan Island.

Additional records.—Wenman (Wolf) Island and Santa Cruz (Indefatigable) Island; both collected by D. Q. Cavagnaro.

Description.—Males small, apterous. Cranium broad, about as broad across eyes as long, circular; varied shades of brown throughout, sides and caudal margin of cranium darker. Eyes small, lacking inter-facet pigmentation, interspace 6 eye-widths. Mandibles short, outer caudal margins not projected; left mandible with an obtuse medial angle. Abdominal tergite 8 with short basal apodemes; T-9 with larger, broadly arcuate apodemes. Tenth tergite and cerci very short, details as figured; epiproct margin not sclerotized; gonapophysis "rods" (GO) present, but fine; hypandrium process (HP) with left side elevated, caudal margin with only a small acute process toward its left corner. Left cercus with apical segment completely absorbed into basal and weakly sclerotized; basal segment of right cercus equal in size to the left cercus, darkly sclerotized, its basal rim not flared. Body length (on slide): 6.0 mm.

Discussion.—This species appears to prefer the often foggy zones at higher levels of all the larger islands. I have speculated that its pioneer stock was closely related to Ecuadorian and Peruvian species of *Chelicerca*, such as *C. loma*, which had been carried to the Galapagos in the plumage of birds and then transported from island to island. Perhaps because of such movement, there appears to be no subspeciation. David Cavagnaro, the discoverer of the species, noted that its galleries commonly radiate in the nests of ground-nesting birds whence embiids could readily, albeit rarely, be carried by birds.

The species is readily identified because of its insular occurrence, apterism, the one-segmented left cercus, and the short talon of the right tergal process.

ACUTA GROUP

Outer basal angles of mandibles strongly, acutely produced. Hypandrium process (HP) caudally tapered, its left side elevated, its mid-apex without a distinct process. Gonapophysis "rods" not developed. The two included species are distinct in many details, such as: presence of a medial flange on left mandible in *C. acuta* (absent in *C. tigre*), the dis-

tinct form and position of 10 RP's talon, and in the more slender, tubular form of the basal segment of the left cercus of *C. tigre*. The two species also are geographically widely separated; *C. acuta* in Colombia and *C. tigre* in Argentina. They may not be closely related.

Chelicerca acuta Ross

new species

(FIGURE 79)

Holotype,—Male, on slide, CAS. Data.—Colombia: 11 mi W of Cali, 1940 m elev., matured in culture 23-III-55 (E. S. Ross).

Description.—Body and appendages varied shades of medium brown, prothorax not paler. Cranium dark mahogany brown, broad across eyes, strongly narrowed caudad. Eyes small, interspace six eye-widths; facet interstices pigmented. Antennae 17-segmented, entirely brown except gradually darker basad. Mandibles prominent, dark amber yellow in basal half, becoming reddish amber distad; apices narrowly and sharply pointed, left mandible with a low medial flange, right with a prominent, acute, molar cusp. RBS of wings contacting costa at extreme wing apex, cross-veins absent except for very faint indications between RA and RP. Terminalia cleft with only minute spiculation and two longitudinal folds but no spicule concentration defining caudal margin of the epiproct. Gonapophysis "rods" absent. Left tergal process (10 LP) broad, flat, with a single, short point directed leftward; right tergal process (10 RP) broadly rounded, its talon short, acute, broad-based, arising midway on the process; hypandrium process (HP) broad, short, slightly tapered, without a distinct caudal process; left margin expanded dorsad; basal segment of left cercus stout, broadly, lobed; segments concolorous. Dimensions (on slide): Body length 7.5 mm; forewing length 5.2 mm, breadth 1.5 mm.

Habitat.—Cultures secured in two cloud forests (11 and 13 mi W and NW of Cali, 1840 and 1820 m elev.). Colonies under bark of stumps in recently cleared pasture.

Discussion.—A male, without precise data, collected in U.S. plant quarantine in orchids shipped from Colombia, probably represents a closely related new species. It differs from *C. acuta* in its unflanged left mandible, unpigmented interstices of eye-facets, pale prothorax and details of its left tergal process.

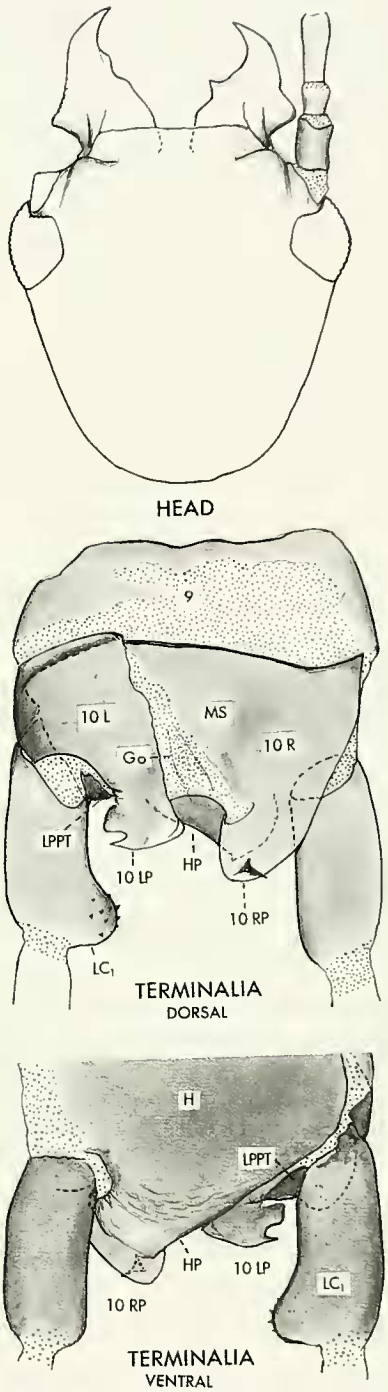

FIGURE 79. *Chelicerca acuta* Ross, new species, holotype. Type locality: Colombia: 11 mi W of Cali.

On the basis of similar basally acute mandibles, *C. acuta* appears to be somewhat related to *C. tigre* of western Argentina. However, there are significant terminalia distinctions, e.g., shape of 10 LP,

shape and position of the talon of 10 RP, and the form of the basal segment of the left cercus. Also, the two species occur in extensively separated regions and distinct habitats.

Chelicerca tigre Szumik

(FIGURE 80)

Chelicerca tigre Szumik, 1998:3.

Holotype.—Male, IML. Data.—Argentina: "Salta; 5 km O de RN. 34, Camino a Zanja El Tigre, 28/29-1-1995, C. Szumik."

The following descriptions are based on specimens from my culture 759, data cited below.

Males.—Shades of dark brown throughout. Cranium darker with small, wide-spaced eyes (interspace 4 eye-widths), facet interstices pigmented. Antennae 20-segmented, basal two segments medium brown, others at first yellowish brown, medials medium brown, distals becoming tan. Mandibles acutely pointed, dark amber apically, otherwise clear yellowish amber; left mandible without a medial flange, the right with an acute molar cusp; outer basal angles acutely produced. Terminalia as figured, shape and origin of I0 RP's talon distinctive. Dimensions (on slide): Body length 7.1 mm, forewing length 4.4 mm, breadth 1.1 mm.

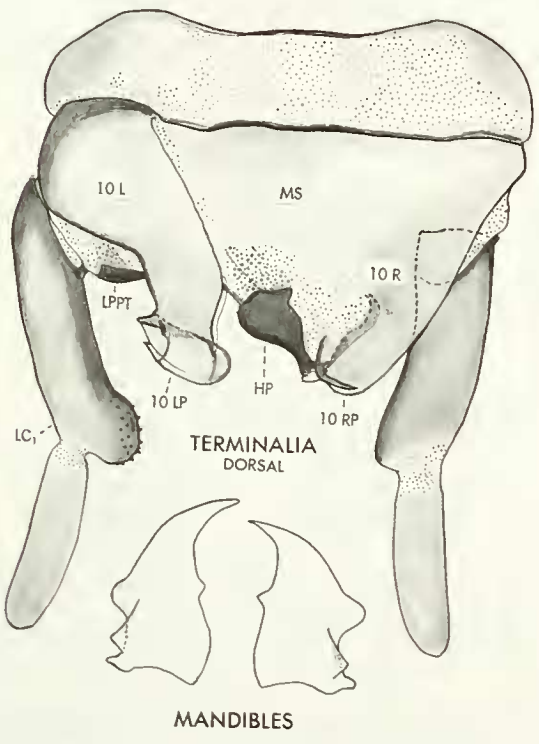

FIGURE 80. *Chelicerca tigre* Szumik. Terminalia of male from Argentina: Orroya Yuta, SW of Oran.

Females.— With coloration paralleling that of males but distinctions as follows: Cranium dark chestnut brown with a faint, darker vertex pattern; frons and clypeus also dark. Antennae, including basal segments, entirely yellowish tan. Prothorax pale straw yellow mottled with tan, membranous areas creamy white. Body sclerites light brown, posterior portions of meso- and meta-scuta pale yellow; all membranous areas creamy white, forming pale intersomital bands on abdomen. All coxae and trochanters creamy white, other leg segments chestnut brown. Cerci pale tan. Body length: I0.0 mm.

New records.—Argentina: Aguas Blancas, Oran, Salta, 2 males, 24-XI-48 (P. Wygodzinsky) CAS. Arroya Yuto, SW of Oran, very large series, both sexes, matured in culture 759 between III and IX, 1965, (E. S. Ross) CAS. 5 mi S of Oran, series matured in culture 760 during VI-65 (E. S. Ross) CAS. Cabeza de Buey, Salta, males matured V-65 in culture 756 (E. S. Ross) CAS. 14 km S of El Carmen, Juyuy, series matured in culture 769 during III to VI-65 (E. S. Ross) CAS.

RIOENSIS GROUP

Males very small, pale tan, weakly sclerotized. Left tergal process (10 LP) broad, flat, smooth-surfaced; bearing a minute point on left corner. Right process (I0 RP) very short, not produced; its talon minute, centered on the process. HP without a caudal process. Tenth tergal cleft entirely membranous, not microspiculated; epiproct and gonapophysis "rods" not conspicuous.

Chelicerca rioensis Ross

new species

(FIGURE 81)

Holotype.—Male, on slide, MZUSP. Data.—Brazil: Rio de Janeiro, matured in culture 693, 11-IV-64, on bark (E. S. Ross).

Description.—Very small; body, antennae and legs tan, cranium and terminalia medium brown. Eyes large, without pigmented facet-interstices; interspace one and a quarter eye-widths, length equal to cranium sides. Mandibles narrowly acute, caudal angles not extensive; inner arc of left mandible with-

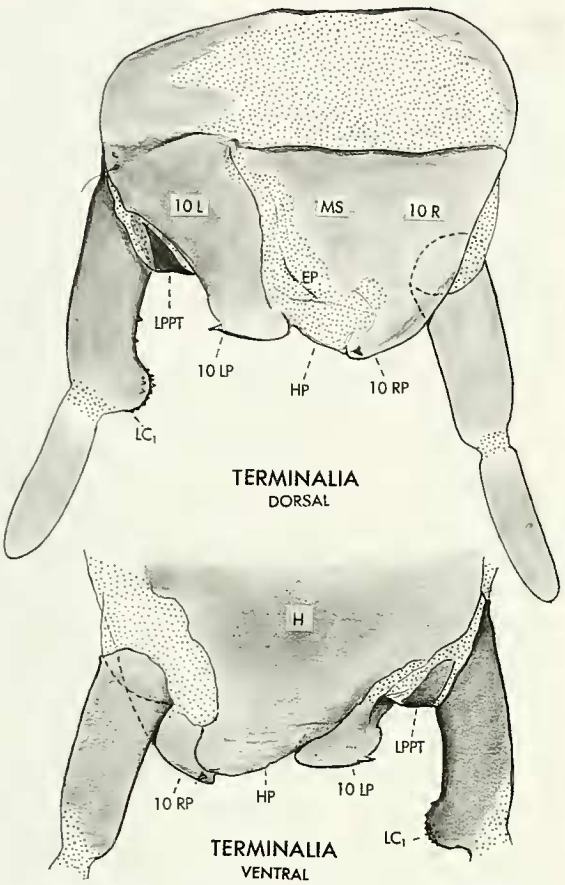

FIGURE 81. *Chelicerca rioensis* Ross, new species, holotype. Type locality: Brazil: Rio de Janeiro.

out a flange; molar cusp of right mandible acutely produced. Terminalia weakly sclerotized, basal margins of tergites straight. Medial cleft of T-10 lacking spiculation; EP margin membranous. Left tergal process (10 LP) broad, flat, not folded ventrad on left side; surface smooth, not spiculated, with a prominent outwardly-directed talon on left caudal corner. Right process (10 RP) short, blunt, its talon very small, short. Hypandrium process (HP) broad, its caudal margin weak, without a process. Gonapophysis "rods" absent. Left cercus two-segmented, the basal with a coarsely echinulated, globular, inner lobe. Dimensions: Body length 5.75 mm; forewing length 4.0 mm, breadth 1.0 mm.

Integumental characters.—As figured.

Allotype.—Female in alcohol, MZUSP. Data.—Reared in holotype's culture.

Description.—Coloration pale, parallel to that of holotype. Body length: 6.0 mm.

Paratypes and parallotypes.—Numerous adults reared in holotype's culture. Deposited in CAS, MNRJ, MZUSP, USNM and BMNH.

Within the city of Rio de Janeiro, this pale species is common in the bark of shade trees, especially in parks. It is one of the smallest species of the genus and is characterized by the exceptionally small talons of the terminalia process. It may prove to be a member of the *Minuta* Group.

NIMBA GROUP

Males with all sclerotized surfaces blackish brown; membranous areas, including abdominal pleura, white. Left tergal process smooth, lacking talon. Right tergal process short, minute. Caudal margin of hypandrium process largely membranous, without a distinct lobe.

Chelicerca nimba Ross
new species
(FIGURE 82)

Holotypes.—Male, on slide, CAS. Data.—Ecuador: 13 km NW San Pedro Bendito, near Zambi, 2300 m, matured in culture 5-II-91 (E. S. Ross).

Name basis.—Latin, *nimbus* = rain-cloud, in reference to the very wet type locality's cloud forest.

Description.—Cranium jet black; eyes almost black, small, interspace four eye-widths; basal antennal segment amber yellow, margined with mahogany brown, basal flagellar segments yellow, grading distad to medium brown, 22-segmented. Cervical and pronotal membranes white, pronotum mostly blackish brown, its anterior and caudal margins golden brown; all other body sclerites, including legs, dark mahogany brown, cerci slightly paler. Dimensions: Body length 8.5 mm; forewing length 6.0 mm, breadth 1.6 mm.

Integumental characters.—Cranium almost as broad as long, eyes without pigmented facet interstices. Cleft of tenth tergite with a central patch of microspicules, but they aren't clumped caudad to form a distinct epiproct margin. Left tergal process (10 LP) broad, gradually sloped ventrad on left side surface entirely smooth, simple without micro-talon or spiculation. Right process (10 RP) mesally straight, outer side arcuate, becoming a point caudomesally, but not projected; talon very small, short, arising on outer edge of 10 RP. Hypandrium pro-

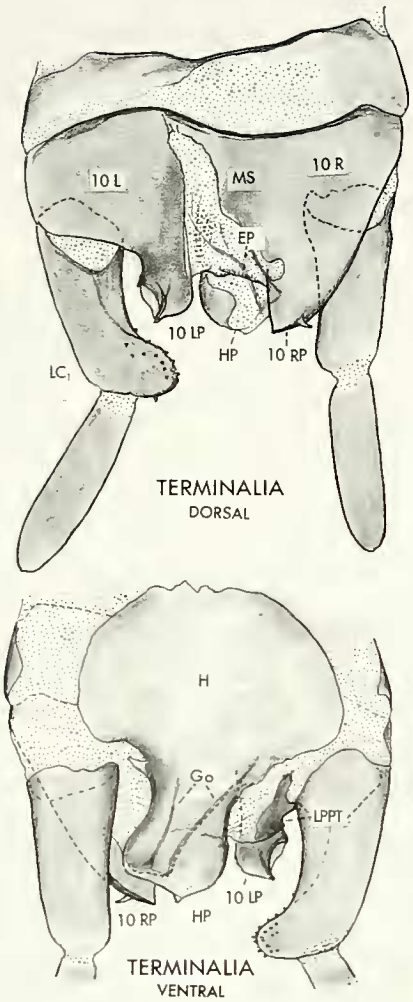

FIGURE 82. *Chelicerca nimba* Ross, new species, holotype. Type locality: Ecuador: 13 km NW of San Pedro Bendito, Loja.

cess (HP) very broad, caudal margin weakly sclerotized and bearing an indistinct, unsclerotized nipple; left side elevated dorsally, but weakly margined. Gonapophysis "rods" distinct, long. Left cercus two-segmented, the basal with a large, coarsely echinulated lobe.

Allotype.—Female, in alcohol, CAS. Data from holotype's culture.

Description.—All sclerotized surfaces blackish brown, cranium especially dark; all membranous areas of body contrastingly white, except mesopleural and metapleural membranes which are very dark lavender; acrotergite 1 extensively yellow, grading caudad to brown. All antennal segments pale yellow, except dark brown basal segment. Extreme bases of mid- and hind tibia white. Mid- and hind tarsi and cerci medium brown. Body length 8.0 mm.

Paratypes and parallotypes.—Numerous specimens from holotype's culture deposited in CAS, USNM, BMNH and NMQ.

Habitat.—Second growth cloud forest. Colonies in bark crevices and splinters.

Discussion.—*Chelicerca mimba* is readily identified by its almost black-brown sclerotized surfaces, which sharply contrast with white membranous areas, including those of the abdominal pleura. Terminalia distinctions include: the smooth-surfaced 10 LP without a micro-talon, the small 10 RP talon, the weak caudal margin of HP without a distinct lobe and the large, coarsely echinulated lobe of the basal segment of the left cercus.

MONTICOLA GROUP

Left mandible of adult males with inner margin broadly obtusely angulate; outer basal area not extensive, angled at 90°. Outer apex of 10 LP complex, folded ventrad, its spine minute, hook-like; surface of inner apex conspicuously microspiculate in at least one species. Apex of 10 RP prolonged; arc of its short, broad-based talon exactly overlaying curvature of its apex which doesn't extend caudad beyond the talon. Cleft medially microspiculated, these not clumped caudad to form a conspicuous margin of the epiproct (which is almost invisible). Hypandrium lobe (HP) often caudally tapered with a small, at times slender, sharp point at its apex; without elevated lateral margins. Gonapophysis "rods" inconspicuous, almost obsolete. Left cercus with distal segment almost entirely absorbed into the basal.

Discussion.—This group comprises two high Andean new species distinguished from each other by presence (*C. spiculata*) or absence (*C. monticola*) of microspiculation on the inner-caudal flange of the left tergal process and differences in the apex of the right tergal process.

Chelicerca monticola Ross

new species

(FIGURE 83)

Holotype.—Male, on slide, CAS. Data.—Ecuador: 3 mi W of Cuenca, Azuay, 3000 m elev., matured in culture 17-II-55 (E. S. Ross).

Description.—Body and appendages varied shades of medium brown, prothorax not paler. Cranium dark mahogany brown, about as broad as long, sides not strongly narrowed caudad; eyes small, interspace six eye-widths, facet interstices not pigmented. Antennae 20-segmented; basal segment dark brown, others at first tan, becoming medium brown distad. Mandibles short, outer basal angles not projected, left mandible with medial flange very low, right mandible without a molar cusp. RBS of wings meeting margin close to wing apex; crossveins almost entirely obsolete. Abdominal pleura creamy white. Medial cleft of terminalia with a dense, central patch of small, evenly spaced microspicules but without clumping on caudal margin of epiproct (EP), which is almost invisible. Gonapophysis "rods" (GO) present but very slender, weakly sclerotized. Left tergal process (10 LP) broad, left side folded basad with only a tiny talon on ventral margin; inner dorsal flange without spiculation. Right process (10 RP) narrow apically rounded with its short, broad-based, arcuate talon lying directly over the apex of the process, not extended beyond its margin; in some specimens the talon has a minute secondary talon at its anterior base. Hypandrium process (HP) acutely narrowed caudad and terminated by a very slender translucent talon which is curved toward left; caudally its margins are weak and ventrally it is medial clear, unsclerotized. Left cercus with distal segment broadly fused with the basal, thus constituting a short weakly sclerotized rudiment. Dimensions (on slide): Body length 7.7 mm; forewing length 5.5 mm, breadth 1.2 mm.

Allotype.—From holotype culture. Cranium and sclerotic portions of body and legs very dark mahogany brown; antennae uniformly pale tan, cervical membranes grayish white; acrotergite I largely pale yellow, dorsal intersomital membranes of meso- and metathorax, as well as those of basal three abdominal somites creamy white. Paragenital sternites dark brown, ventral pleural membranes of abdomen tinged with lavender. Paraprocts and cerci largely yellowish tan, their adjacent membrances creamy white. Body length (in alcohol): 7.5 mm.

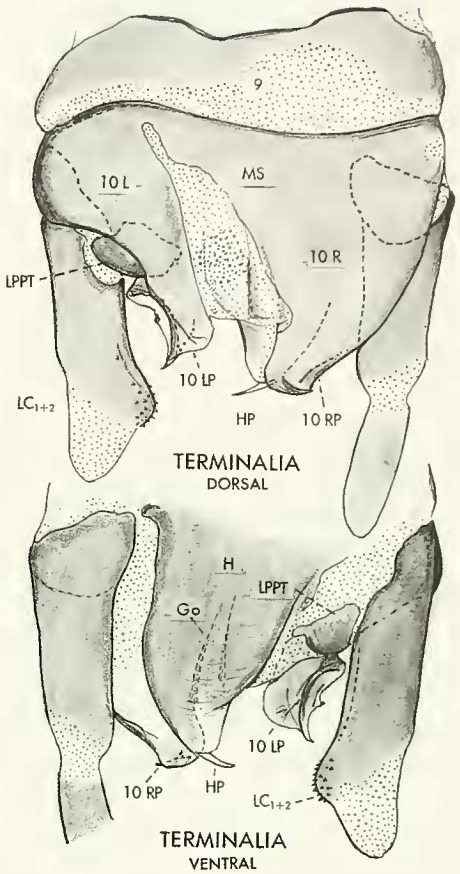

FIGURE 83. *Chelicerca monticola* Ross, new species, holotype. Type locality: Ecuador: 3 mi W of Cuenca, Azuay.

Paratypes.—A series from the holotype's culture, others from nearby Parque Nac. Cajas, 3500 m elev., and Lago Zhurucucho 3700 m elev. (est.). Deposited in CAS, USNM, and MNC.

Habitats.—Road bank crevices in páramo zone and bark crevices in cloud forest. *Andesembia cuencae* Ross (Andesembiidae) also occurs in these habitats.

Additional records (CAS).—Ecuador: 8 km N Sevilla de Oro, Azuay, 2840 m elev., in lichens on rocks, matured in culture 17-II-55 (E. S. Ross). Ecuador: Tixán, 8 mi NE Alausi, Chimborazo, 2800 m elev. (est.); in roadbank cracks and under lichens, matured in culture II and III-55 (E. S. Ross). Also,

30 mi SW Alausi, 2500 m elev. (est.), beneath bark flakes in cloud forest remnant in canyon (E. S. Ross).

Chelicerca spiculata Ross
new species
(FIGURE 84)

Holotype.—Male, on slide, CAS. Data.—Peru: 4 mi W Otusco, La Libertad, 2500 m elev. (est.), matured in culture 26-I-55 (E. S. Ross).

Description.—Body and appendages varied shades of medium brown, prothorax not paler; cervical and anterior membranes creamy white, the latter forming a pale intersomital band; cranium medium brown, prothorax not paler, very dark, almost blackish brown, longer than broad, sides long, narrowed caudad. Eyes very small, interspace six eye-widths, facet interstices not pigmented. Antennae uniformly dark brown. Mandibles short, outer basal angles slightly projected, the angles 90°, left mandible with medial flange very low, broadly obtusely angulate, right mandible without a molar cusp. Wings similar to those of *C. monticola*. Terminalia, as figured, distinct from *C. monticola* only in details of 10 LP, including a larger ventral talon and a densely spiculate inner caudal flange; cleft membrane caudally creamy white; 10 RP almost identical to that of *C. monticola* but broader and shorter. HP shorter, broader; caudally not tapered; its caudal margin semicircular, reflexed and darkly sclerotized, continued forward to H as dark broad sclerotic margins, extreme apex with a small translucent point, angled leftward. Gonapophysis "rods" small, slender, dark brown. Distal segment of left cercus a short, weakly sclerotized lobe broadly fused to the basal segment and is contrastingly yellowish cream in color. Dimensions (on slide): Body length 6.5 mm; forewing length 4.3 mm, breadth 1.0 mm.

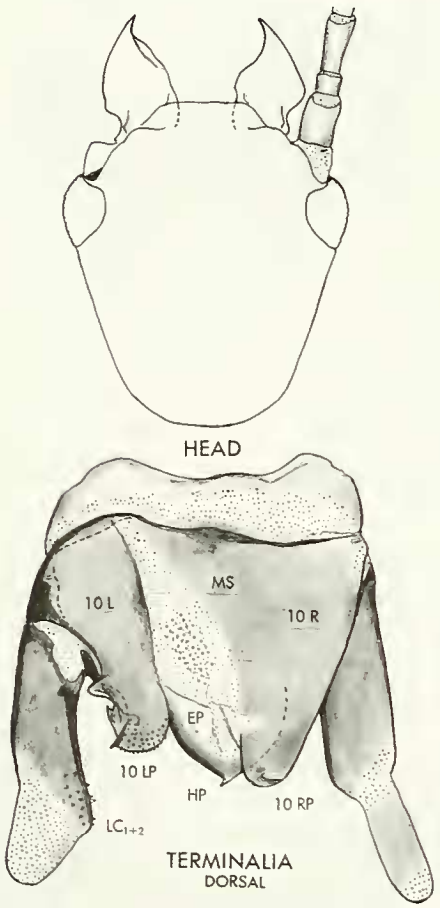

FIGURE 84. *Chelicerca spiculata* Ross, new species, holotype. Type locality: Peru: 4 mi W of Otusco, La Libertad.

Paratypes.—Four topotypic males, CAS; no females.

Habitat.—Arid hills with numerous cacti and other xerophytes.

Discussion.—The type locality is considerably south of that of *C. monticola* and the species is much smaller in size. I also cultured a large series of a closely related species, or race, occuring in the Peruvian Andes, in cloud forest, 2000 m elev. (est.), 28 mi E of Olmos, Lambayque, matured 14-I-55. Males are larger, paler brown, details of 10 LP are distinct, including a shorter mesal flange which lacks spiculation. The habitat was bark flakes and splintered stumps in cloud forest. In the same place I collected stock for the culture of *C. andesina*, a very distinct new species.

RONDONIA GROUP

Mandibles of males very narrowly tapered, without medial flanges; outer bases weakly sclerotized, globose, not angulate. Eyes exceptionally large, interspace less than one eye-width. Basal margins of eighth and ninth abdominal terga weak, without

apodemes. Apex of left tergal process (10 LP) truncate with a minute, almost medial talon. Outer margin of right hemitergite (10 RP) very weak, almost invisible, its process scarcely projected, weakly arcuated on its outer side; talon minute, inconspicuous, bearing a second, translucent point on inner corner. Cleft with microspiculation inconspicuous, epiproct margin also inconspicuous. Hypandrium process (HP) evenly arcuated, without a caudal process or projection. Gonapophysis "rods" absent. Basal segment of left cercus distally enlarged but not distinctly lobed; echinulations sparce, confined to inner apex.

This group comprises only the following, small, weakly sclerotized new species which is notable for its distinct mandibles, the peculiar inner corner of the right tergal process and, most important, with a unique, small, translucent point in addition to a very minute talon.

Distribution.—Brazil: Rôndonia.

Chelicerca rondonia Ross

new species

(FIGURE 85)

Holotype.—Male, on slide, CAS. Data.—Brazil: 62 km S Ariquemes, Fazenda Rancho Grande, Rôndonia, 187 m elev., matured in culture VI-92 (E. S. Ross).

Description.—Cranium medium mahogany brown, without pattern. Eyes very large, black, interspace less than one eye-width; sides behind eyes less than one eye-length; facets very large, interspaces not pigmented. Antennae 16-segmented, uniformly pale tan except for two darker basal segments; distal segments gradually becoming pale. Mandibles very narrowly tapered to sharp points, outer basal areas abruptly globose; inner margin of left mandible smoothly incurved, without a medial flange, or a pointed molar cusp; right mandible similar except for its prominent, acute molar cusp. Body and legs varied shades of pale tan; prothorax not contrastingly pale. Wings with RBS not slanted into costa before wing apex, cross-veins absent except for one between RA and RP (absent in some paratypes). Terminalia with 10 LP flat, folded ventrad on outer side; apical margin truncate, with only a minute, scarcely visible medial talon. Right process (10 RP) very broad, short, outer corner rounded, talon minute; bearing a second, translucent

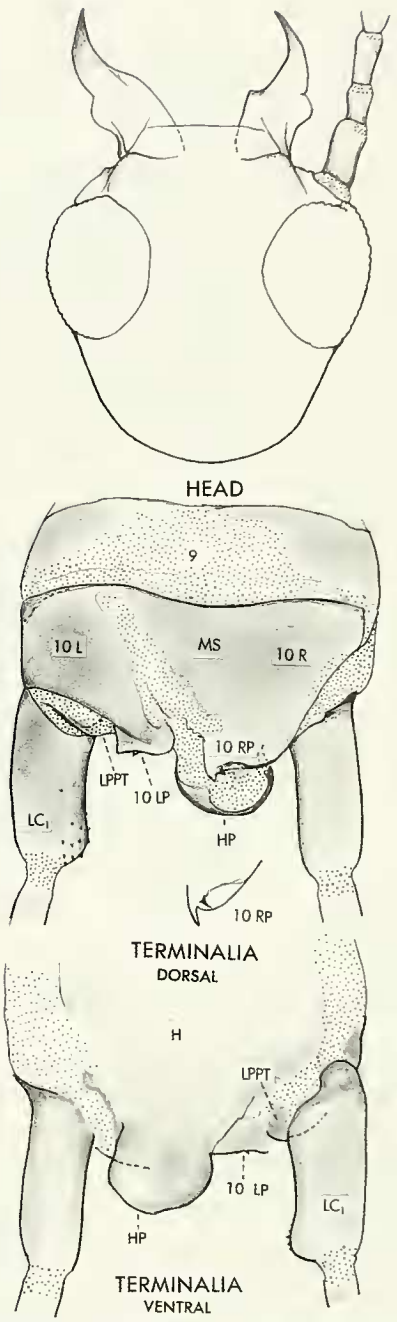

FIGURE 85. *Chelicerca rondonia* Ross, new species, holotype. Type locality: Brazil: 62 km S of Ariquemes, Rondônia.

microprocess on its inner corner. Cleft spiculation inconspicuous, without a dark concentration on epiproct margin. Apex of hypandrium process (HP) evenly rounded, narrowly rimmed, without a medial lobe or process. Basal segment of left cercus

distally swollen, not distinctly lobed. Dimensions (on slide): Body length 5.7 mm; forewing length 4.4 mm, breadth 1.2 mm.

Paratypes.—A few males (CAS) from holotype's culture, one deposited in MZUSP.

LOMA GROUP

Males alate. Mandibles with outer basal areas rounded, not projected; left mandible with only a low arcuate medial flange. Medial cleft of tenth tergite with moderate microspiculation and a definite epiproct margin (EP). Left tergal process (10 LP) complexly folded ventrad, ventral hook prominent. Right process (10 RP) apically rounded, extended caudad of talon which is long, slender, extending well beyond outer margin of process. Hypandrium process (HP) broad, all margins sclerotic, the caudal irregular, bearing a small non-sclerotic nipple. Gonapophysis "rods" (GO) conspicuous, long and slender. Left paraproct (LPPT) exceptionally large. Basal segment of left cercus not distinctly lobed, apical segment small but not fused to basal.

Distribution.—Coastal Peru and higher elevations of Andes of northern Peru and southern Ecuador.

Chelicerca loma Ross

new species

(FIGURE 86)

Holotype.—Male, on slide, CAS. Data.—Peru: Loma Lachay, 16 mi NW of Chanchay, matured in culture VII-55 (E. S. Ross).

Name basis.—Spanish, *loma*, for the species' foggy coastal habitat.

Description.—Small, alate; head, body and appendages uniformly dark brown. Cranium broad, unicolorous; eyes small, interspace six eye-widths, facet interstices light brown. All antennal segments dark brown, the basal darker, 19-segmented (complete). Mandibles small, outer sides curved, basal angles not acutely projected; medial flange of left mandible low, broadly arcuated. RBS merged with costa well before wing apex, RA-RP cross-veins absent. Terminalia with basal angles of T8 and T9 with prominent apodemes. 10 LP complex, outwardly folded ventrad with a large claw-like medial talon; rounded inner corner densely microspiculate. Apex of 10 RP rounded; its talon large, slender, striate, arced outward across entire apex of the process. Epiproct fold (EP) sclerotic, sinuously connected to inner margin of 10 R. Margins of HP irregular, apex with a small non-sclerotic nipple. LPPT sclerite very large. Gonapophysis "rods" (GO) well developed, long, slender. Basal segment of left cercus echinulate but not abruptly lobed, apical segment short but not fused to the basal. Dimensions (on slide): Body length 6.2 mm; forewing length 4.5 mm, breadth 0.9 mm.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Body sclerites and all antennal, leg and cercus segments medium brown; prothorax slightly darker; cranium dark chestnut brown. Intersomital membranes transparent, pale due to whitish internal tissue.

Paratypes.—Numerous topotypic males deposited in CAS, USNM, MSU, and NMQ. Matured in culture I, VII, X, 1955. (E. S. Ross). Loma (fog) zone, under lichens on rocky ledge.

Additional records (CAS).—All on Peruvian coast: 23 mi N Pativilca, 110 m elev. (est.), under stone on silt; 5 mi NW Chilca, Lima Prov., under stones and lichens, 100 m elev. (est.); 40 mi SW Nasca, on bluff above sea, 1000 ft elev. (est.); N and S of Cañete, under stones and dung; SE of Camana; bluffs above Mollendo (all E. S. Ross coll.).

In 1975, Pedro G. Aquilar, without use of a species name, presented biological notes on this species and made reference to the literature on other South American embiids.

Additional records.—Surprisingly, specimens I cultured from inland northern Peruvian and highland Andean localities of Ecuador have male terminalia almost identical to specimens from the above-cited lowland, foggy, desert localities. They differ from typical *C. loma* in having most antennal segments pale translucent yellow (entirely dark brown in typical *C. loma*) and interstices of eye facets clear instead dark as in *C. loma*. Future studies may indicate that specimens with these distinctions represent one or more distinct taxa. I collected them in the following localities: Peru: 47 mi E of Olmos, Lambayeque, 1200 m elev. (est.), Atlantic drainage, under stones in an arid thorn bush environment. Ecuador: 5 km N of Catamayo, Catamayo, 1400 m elev. under stones in an arid canyon with cacti and other

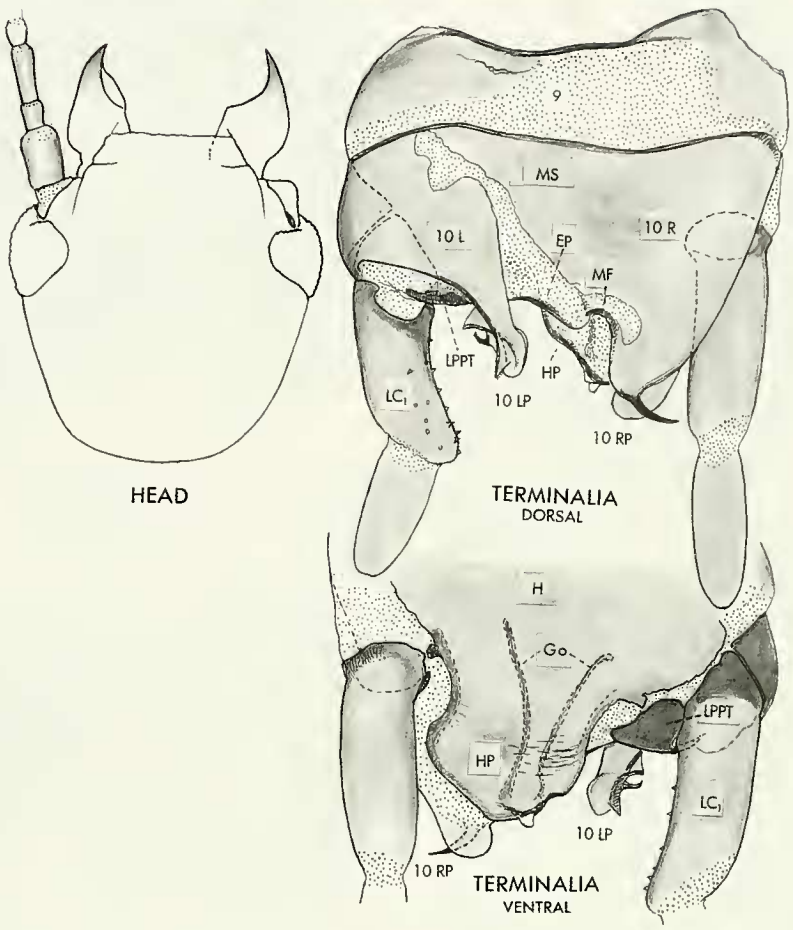

FIGURE 86. *Chelicerca loma* Ross, new species, holotype. Type locality: Peru: Loma Lachay (N of Lima).

thorny vegetation. Ecuador: 7 km S Jimbillo, 2740 m elev., in extensive galleries in hanging moss in a damp cloud forest clearing.

SPATHULA GROUP

Mandibles of adult males broadly, sharply acute; left mandible with a very low, obtuse flange, lacking on the right mandible, neither mandible has a produced molar cusp; both with an outer-basal carina but no acute outer-basal projection. Basal margins of tergites 8 and 9 with large apodemes. Left tergal process complex, outer side with a hook-like talon, is folded ventrad and concave; inner corner rounded, densely microspiculate. Right process thin, rounded; its talon is large, tapered, and projects across apex of the process. Microspicules in cleft dense, caudally concentrated, forming a distinct epiproct margin. Gonapophysis "rods" well developed but extremely fine. Hypandrium lobe with elevated, sclerotic, lateral flanges which narrowly and finally broaden to form a weakly sclerotized, broad spatula which bears a tiny point left of its center. Basal segment of left cercus gradually expanded and coarsely echinulate, but not definitely lobed; apical segment unusually short but well separated from the basal.

Discussion.—Tentatively, my extensive series of specimens from several SW Ecuadorian localities is treated as a single species.

Chelicerca spathula Ross
new species
(FIGURE 87)

Holotype.—Male, on slide, CAS. Data.—Ecuador: 15 mi E of Santa Elena, Guayas, near sea level, matured in culture 4-V-1955 (E. S. Ross).

Name basis.—Suggested by the unusual, spatulate apex of the hypandrium process.

Description.—Body and appendages varied shades of medium brown, pronotum straw yellow, adjacent membranes creamy white; femora and cerci entirely medium brown. Cranium across eyes as wide as cranial length. Eyes rather small, interspace a little less than three eye-widths; facet interstices not pigmented. Antennae 18-segmented, entirely light brown except for darker basal segment. Mandibles pale amber yellow, becoming golden amber apically. Wings with RBS slanted into costa before wing apex, forewings with three RA-RP cross-veins. Abdominal terminalia as described and figured for the Group. Dimensions: Body length 7.2 mm; forewing length 5.5 mm, breadth 1.6 mm.

Allotype.—Female, in alcohol, CAS. Data.—From holotype's culture.

Description.—Coloration almost identical to that of holotype. Body length 8.0 mm.

Paratypes.—Numerous adult males, CAS, from holotype's culture, matured IV-VII-1955 (E. S. Ross) and series from 5 mi N Santa Elena, matured in culture IX-VIII-1964, CAS (D. C. Cavagnaro). Deposited in CAS, USNM, BMNH, and NMQ.

Additional records (all SW Ecuador).—Guayas: 10 mi N Manglaralto, II-1955 (E. S. Ross), CAS. Manabi: 3 km S Bahia de Caráquez, 100 m elev., matured in culture VI-1996 (E. S. Ross), CAS. El Oro: 9 mi SE Santa Rosa, matured IV-1955 (E. S. Ross), CAS. Los Rios: Pichilingue, matured II-1955 (E. S. Ross), CAS.

Discussion.—Males from most of the above localities have a prothorax as dark brown as the pterothorax. Those from coastal Manabi generally are paler than those from southern and inland localities, but aren't anatomically distinct. A male from near Manglaralto is darker brown and has the distal left cercus segment almost completely absorbed. In most specimens the degree of LC_2 absorption varies, many males have a normal distal segment. Males from Santa Rosa and Pichilingue are uniformly darker brown and the spatula of HP is much smaller.

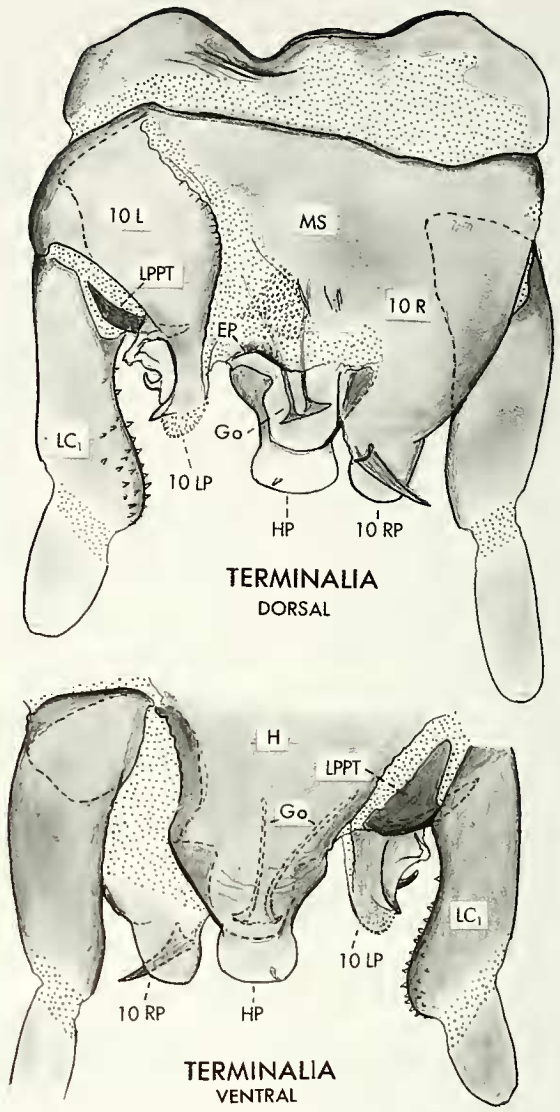

FIGURE 87. *Chelicerca spathula* Ross, new species, holotype. Type locality: Ecuador: 15 mi E of Santa Elena.

Habitats.—The coastal localities are subject to a long dry season and the vegetation, seasonly dry, leafless scrub, includes large silk cotton trees. A few yet-to-be described Teratembiidae were collected in this zone and, surprisingly, *Archembia arida* Ross (EMBIA, Part 3, p. 16) conspicuously webs dry tree bark and spiney cactus stalks. Otherwise the genus *Archembia* is confined to the Amazon Basin and SE Brazil.

The Santa Rosa, El Oro locality, 9–15 mi SE, near Arenillas, 300 m elev., when visited in 1955, was lowland, evergreen, tropical forest with embiid colonies in bark crevices of the trees shading coffee plantations. The potential types of *Calamoclostes silvestris* Ross (EMBIA, Part 3, p. 21) occupied the same habitats as *Chelicerca spathula*. This was surprising because all other *Calamoclostes* occur at higher elevations in the Andes. *Chelicerca spathula* males in this more remote, damper habitat differ in having the spatula of HP very small and narrow. They may represent a new species or subspecies. Stock for the Pichelingue culture was collected under bark flakes of a large acacia tree near an experiment station, 8 mi SW Quevedo, 50 m elev.

ANDESINA GROUP

Left mandible of males usually with a large, obtuse tooth on inner margin; outer basal area of both mandibles globose with a subdorsal, shallow groove. Outer apex of 10 LP slanted ventrad, not vertical, its medial spine minute; inner apex broad, arcuate, surface densely microspiculated. Apex of 10 RP broad, extended caudad slightly beyond its talon which is large, broad-based and striate. Cleft membrane medially spiculated, some of the spinules clumped, defining caudal margin of epiproct (EP). Hypandrium process (HP) broad, margins darkly sclerotic and reflexed; right margin arcuated, narrower than the left; apex of HP bearing a distinctive, acute point abruptly pointed leftward, its venter evenly sclerotized. Gonapophysis "rods" (GO) slender, weakly sclerotized. Left cercus two-segmented, the distal normally articulated.

Discussion.—Closely related to the *Monticola* Group, this group includes a distinct species collected in several high Andean localities in central Ecuador and northern Peru. Before agriculture these places may have been clothed with cloud forest. Future studies based on more extensive collecting may reveal a complex of distinct species and/or subspecies. All populations have in common the peculiar HP. At the Peruvian locality, cited below, I also collected *C. spiculata* n. sp. Its close relative. *C. monticola*, occurs in the same Ecuadorean localities.

Distribution.—Higher elevations of northern Peruvian and central Ecuadorian Andes.

Chelicerca andesina Ross

new species

(FIGURE 88 A, B)

Holotype.—Male, on slide, CAS. Data.—Peru: 28 mi E Olmos, Lambayeque, bark flakes in cloud forest, matured in culture VI-55 (E. S. Ross).

Description.—Body and appendages very dark brown, prothorax as dark as pterothorax. Cranium no darker than body, about as broad as long, sides narrowed caudad; a long, straight, sclerotic line extends from outer corner of each tentorial slit to the interior anterior corner of each eye; eyes small, interspace six eye-widths, facet interstices not pigmented. Antennae 18-segmented; basal segments tan, others grading to medium brown distad. Mandibles stout, basal two-thirds golden yellow, dental margins dark amber; left mandible with a prominent, obtuse subapical tooth; outer basal area thickened but not strongly projected outward, bearing a shallow groove on outer, dorsal surface; right mandible without a projected molar cusp. RBS merging with front wing margin before wing apex; two cross-veins between RBS and RP; wing bands moderately dark with narrow, sharply defined hyaline intervals. Medial cleft of terminalia with a patch of microspicules basad of middle; epiproct margin (EP), marked by a line of smaller microspicules. Gonapophysis "rods" (GO) weakly sclerotized, scarcely visible. Left tergal process (10 LP) broad, as figured; left side relatively simple, right side densely microspiculated. Right process (10 RP) broad, subdistally bearing a broad-based, dark, striate talon; inner margin of process (in some specimens) with a submembranous, microhirsute flap with a 90° caudal outline. Hypandrium process (HP) as figured, especially significant is the sclerotic reflexed caudal margin with a stout, left-directed, sharp process. Distal segment of left cercus articulated. Dimensions (on slide): Body length 7.5 mm; forewing length 4.0 mm, breadth 1.2 mm.

Allotype.—Female, in alcohol, CAS, from holotype's culture.

Description.—Sclerotic surfaces of head, body and legs blackish brown except acrotergites which are light golden tan. All membranous areas creamy white, crests of folds in meso- and metathorax membranes tinged with lavender. Basal antennal segment golden tan, all other segments (18) paler yellow tan to apex. Cerci tan with pale tips. Body length 10.0 mm.

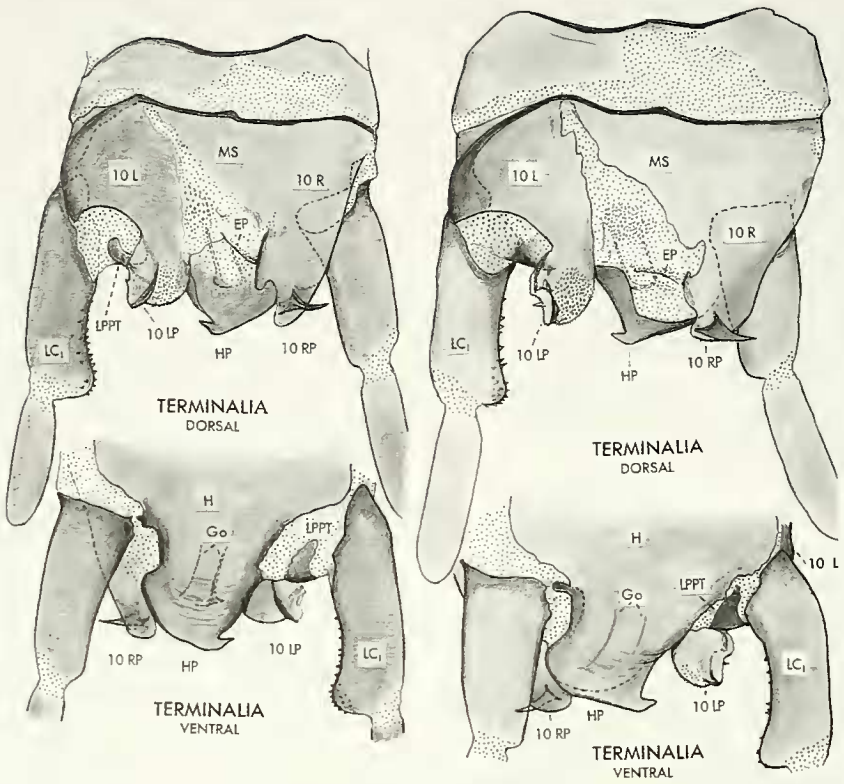

FIGURE 88 A, B. *Chelicerca andesina* Ross, new species. A. Terminalia of holotype. Type locality: Peru: 28 mi E Olmos, Lambayeque. B. Terminalia of a male from Ecuador: Alausi, Azuay.

Paratypes and parallotypes.—Numerous specimens reared in type culture, deposited in CAS, USNM, BMNH and NMQ.

Additional records (CAS).—Ecuador: Alausi, Azuay, colonies in crevices of a vertical silty cliff above town, 2550 m elev., adults matured I-92 (E. S. Ross); 8 mi E of Paute, Azuay, colonies in a rock wall, adults matured XII-55 (E. S. Ross); N of Ona on Rio Leon, Azuay, 2300 m elev., adults matured 26-V-65 (D. C. Cavagnaro); Canyon below Guasuntos, 2350 m elev., under stones in arid habitat, adults matured in culture 8-II-91 (E. S. Ross).

Discussion.—Topotypic males are larger than those from Ecuadorian localities, otherwise the terminalia characters are remarkably similar in spite of the geographic and ecological differences. Equally interesting, a distinct species of *Chelicerca* (*monticola*) occurs in the same Ecuadorian localities.

BARBARA GROUP

Males usually apterous, uniformly blackish. Left mandible with a broad, obtusely angulate medial flange. Outer angles of mandibles produced. Left tergal process (10 LP) with inner portion extensively and thinly produced mesad. Talon of 10 RP arising high on inner margin, then, projected straight caudad (not arcuate). Hypandrium lobe (HP) heavily sclerotized; its rim narrow; arcuate, higher on left side; with a small, sharp spine on its left side. Epiproct (EP) microspiculate.Gonapophysis "rods" (GO) minute. Basal segment of left cercus (LC_1) cylindrical, without an inner apical lobe.

The group includes a single, very distinct species from west-central Argentina.

Chelicerca barbara Szumik

(FIGURE 89)

Chelicerca barbara Szumik, 1998:1, figs. 1–9.

Holotype.—Male, IFML. Data.—Argentina: 16 km E Santa Clara, RP 6, Jujuy, 2-II-95 (C. Szumik).

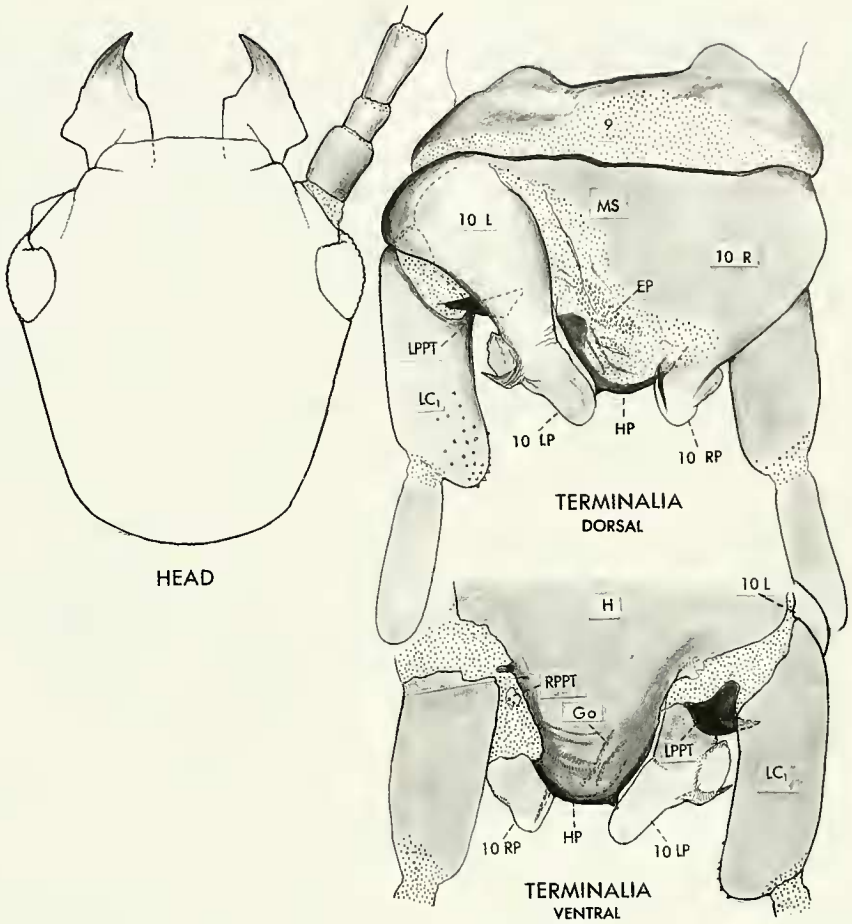

FIGURE 89. *Chelicerca barbara* Szumik. Head and terminalia of a male from Argentina: 50 mi S of Jujuy, Salta.

Plesiotype.—Male, on slide, CAS. Data.—Argentina: La Cornice, 50 mi S Jujuy, Salta, culture 757 (E. S. Ross).

Description.—Apterous; head and terminalia almost black, body varied shades of dark mahogany brown. Cranium elongate, tapered caudad; eyes small, interspace about seven eye-widths; antennae exceptionally long, 20-segmented, unicolorous medium brown. Mandibles broad, dark brown; left one with a low, arcuate, medial flange; outer basal angles obtusely produced, paler in coloration. Prothorax mahogany brown, its caudal third and acrotergite yellowish. Mesothorax mahogany brown except for a creamy white caudal band. Body otherwise mahogany brown with gray membranous areas. Wings (of other specimens) with RBS merging with costa near distal curvature; cross-veins confined to RBS-RP are very indistinct; hyaline stripes very narrow, borders of RBS pale. Legs varied shades of mahogany brown. Sclerotic portions of terminalia glossy dark mahogany brown, processes becoming dark amber distad; caudal rim of hypandrium process (HP) almost black; cleft membrane creamy white, pale amber in the microspiculate area; basal segments of the two-segmented cerci mahogany brown, distal segments tan.

Anatomical distinctions.—Anterior margin of terga 8 and 9 deeply emarginated medially, forming large apodemes; basal margin of tergite 10 straight, sclerotic. Medial cleft extended to base, flared caudad, strongly curved basad toward left; without epiproct structure except for a large, dense patch of microspicules. Left hemitergite (10 L) with outer and caudal margin sclerotic, its inner margin weak. Left process (10 LP) pale amber with an exceptionally large, thin, spatulate, apically-rounded, caudo-me-

sal extension folded down, outer margin bearing a large, striated, medial "talon." Right hemitergite (10 R) very large, its process (10 RP) broad, thin, apically-rounded; "talon" very slender, arising high up on inner margin of the process, thence projected almost straight caudad. Hypandrium process (HP) very broad, heavily sclerotized, almost black, caudal margin arcuate, strongly rimmed, especially on left side; bearing a small, sharp, thorn-like process. Ejaculatory duct with a pair of very small, slender gonapophysis "rods" (GO). Left paraproct (LPPT) a dark, prominent, triangular, isolated, caudally-arcuated sclerite. Right paraproct (RPPT) an obscure patch of setae. Basal segment of left cercus stout, cylindrical, without a definite lobe, but bearing scattered echinulations in distal half. Body length 10 mm.

Females.—My extensive plesio-topotypic series wasn't studied. Coloration similar to males.

Records.—Various localities in Salta and Jujuy are recorded by Szumik. New records: Plesiotypic series comprises many adults of both sexes (CAS), matured in culture C-757 throughout 1964, especially during July and August. Culture stock was collected by me under bark in a humid evergreen forest. Salta: Angostura de Arias, 15-I-51 (P. Wygodzinsky), 1 alate male (CAS).

Discussion.—A separate group status is based on a combination of unusual characters, as follows: the broad shape of mandibles, absence of sclerites in the cleft of the tenth tergite, peculiar tergal processes, very small gonapophysis "rods," a very heavily sclerotized HP and, especially, the robust, unlobed basal segment of the left cercus. *Chelicerca tigre* Szumik, a very distinct Argentine species, and *C. barbara* are the most southernly occurring anisembiids in South America.

Genus *Oncosembia* Ross, new

Type species.—*Oncosembia biarmata* Ross, new species, by present designation.

Distribution.—Brazil: Bahia.

Name basis.—Greek *onkos* = hook or barb, in reference to the two "talons" on the right tergal process.

Diagnosis (males).—Large (body length about 12 mm), the largest chelicerine. Dark brown with paler prothorax. Eye-interspace two and one-half eye-widths. Antennae unicolorous brown, 22-segmented (complete). Mandibles short, left mandible without a medial flange, molar surfaces rounded. RBS of wings not merged with C, M+RP and RP sclerotized; MA, MP and Cu_{1a} represented only by setae; cross-veins are limited to RBS-RP, and are very faint; hyaline stripes very narrow, sharply defined. Anterior margins of abdominal terga 8 and 9 deeply emarginated, sclerotic. Tenth tergite cleft to basal margin; apical margin of 10 LP irregular without a "talon," at times slanted downward; 10 RP bearing two "talons," the distal largest, the second (basad) either large or small. Rim of EP a sclerotic arc. Gonapophysis "rods" (GO) reduced, hair-like. Hypandrium process (HP) medial, large; its caudal margin arcuated without lobes, spines or spiculation. Left paraproct (LPPT) a typical chelicerine, small, triangular sclerite in membrane at inner base of left cercus. Right paraproct (RPPT) fleshy, unsclerotized, except for a possible sclerotic portion found to the left of HP. Basal segment of left cercus lobed, echinulated, distal segment separate or fused (partially "absorbed").

Females.—Large, robust; dark brown, prothorax golden.

Discussion.—This is the only Chelicerine species with two dorsal "talons" on inner caudal surface of the right hemitergite.

Oncosembia biarmata Ross

new species

(FIGURES 90, 91)

Holotype.—Male, on slide, CAS. Data.—Brazil: 20 km SW Jequie (on roadbank near microwave station), Bahia, 600 m elev., matured in culture 19-VII-92 (E. S. Ross).

Description.—Appearance: Slender, alate, dark mahogany brown except for creamy white pronotal margins and maculation of abdomen. Color details (alive): Cranium, mouthparts and antennae dark brown; eyes as dark as cranium; membranous areas dark lavender. Pronotum narrow, dark brown medially, abruptly pale creamy white along lateral and posterior margins due to white fat globules within; cervical and prothoracic membranes creamy white, sclerites dark brown to tan. Pterothoracic sclerites dark piceous brown, membranous areas varied shades of pale lavender to cream. Prothoracic legs dark piceous brown except for an indistinctly paler brown area of mid-femora; other legs similar except

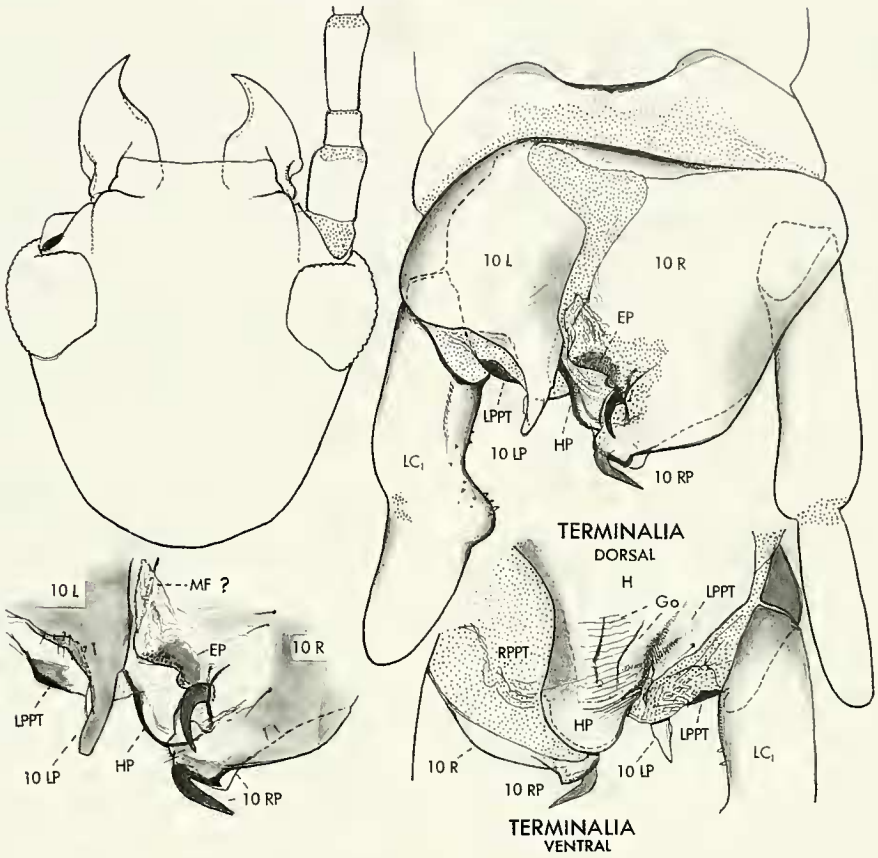

FIGURE 90. *Oncosembia biarmata* Ross, new species, holotype. Type locality: Brazil: 20 km SW of Jequie, Bahia.

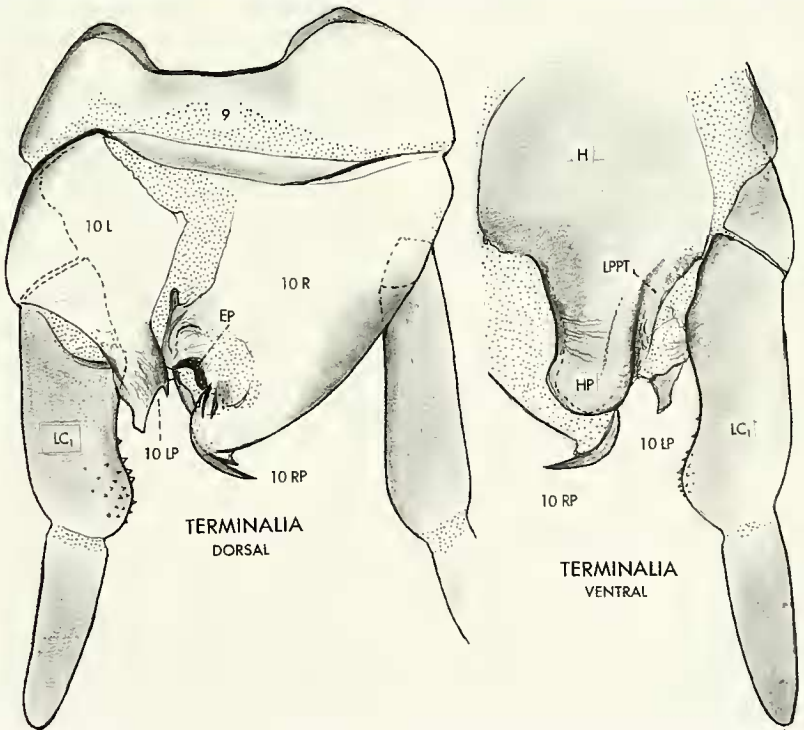

FIGURE 91. *Oncosembia biarmata* Ross, new species. Terminalia of a male from 10 km SE of Ipiau, Bahia.

for more distinctly pale mid-femora and light brown tarsi. Wings dark brown with very narrow hyaline stripes, pink borders of RBS especially bright; axial area creamy white. Abdomen (except terminalia) yellowish tan except for complex, diffused medium brown pattern. Terminalia contrastingly dark piceous brown with brownish lavender membranes; apices of talons and processes dark amber; basal cercus segments medium brown bordered by piceous brown, distal segments medium brown. Dimensions (on slide): Body length 12.0 mm; forewing length 7.1 mm, breadth 0.76 mm.

Discussion.—Stock for a second culture of *Oncosembia* was collected on the bark of residual rainforest trees serving as cover in a cocoa plantation 10 km SE of Ipiau, Bahia, 100 m elev. The habitat was appreciably lower in altitude and damper than that of the type locality of *O. biarmata* (at 600 m) where the vegetation was dense second growth. The colonies were very large on mossy bark. The silk, obscured by pulverized material, was somewhat lavender in color. Therefore, they were readily distinguished from those of a species of *Archembia* (probably *A. bahia* Ross described in EMBIA Part 3 from the type locality of *O. biarmata*) which have conspicuously white galleries on the same tree trunks. At the time of encounter only very active, robust females and nymphs were present but a few males matured later in the year. Unfortunately, the culture died before producing an adequate series of adults. Apparently, the embiids were infected with *Diplocystis*, a sporozoan parasite.

It is possible that the Ipiau population represents a distinct species because males have a much smaller, basal 10 RP talon and a two-segmented left cercus. However, because the two populations occur only about 30 km apart, I have concluded that they represent a single variable species.

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